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The Next Issue of MoToR BoatinG

The April issue of MoToR BoatinG will be our Annual Spring Number. It will be out just at the time when the work of putting the boats into commission is at a fever heat. This has led us to make plans which will make the April issue one of the most interesting ever published.

Several new features will be introduced in the Spring Number of MoToR BoatinG. The first instalment will appear of a very important and interesting series of articles dealing with the commercial motor boat. Another series will start showing the value of the canals and other inland waterways of the country to the motor boatmen both from a pleasure and commercial standpoint. Several writers, all of them new to the columns of MoToR BoatinG, but all authorities in their respective lines, will contribute articles on timely subjects.

The regular features will not be curtailed in the least. The Navigation series, the Ideal Runabouts, the Prize Contest, the Helpful Hints, AiR BoatinG, and a whole lot more will be more interesting than ever.

NOTICE TO SUBSCRIBERS—*If your copy of MoToR BoaTinG does not reach you promptly, do not assume that it has been lost in transit. Owing to the present congested condition of the railways, delays in the operating of mail-trains are inevitable. Therefore in the event of the magazine's non-arrival at the usual time, our subscribers are advised to wait a few days before writing us, for by that time it will probably be in their hands*

March, 1918 — MOTOR BOATING — Vol. XXI, No. 3

THE NATIONAL MAGAZINE OF MOTOR BOATING

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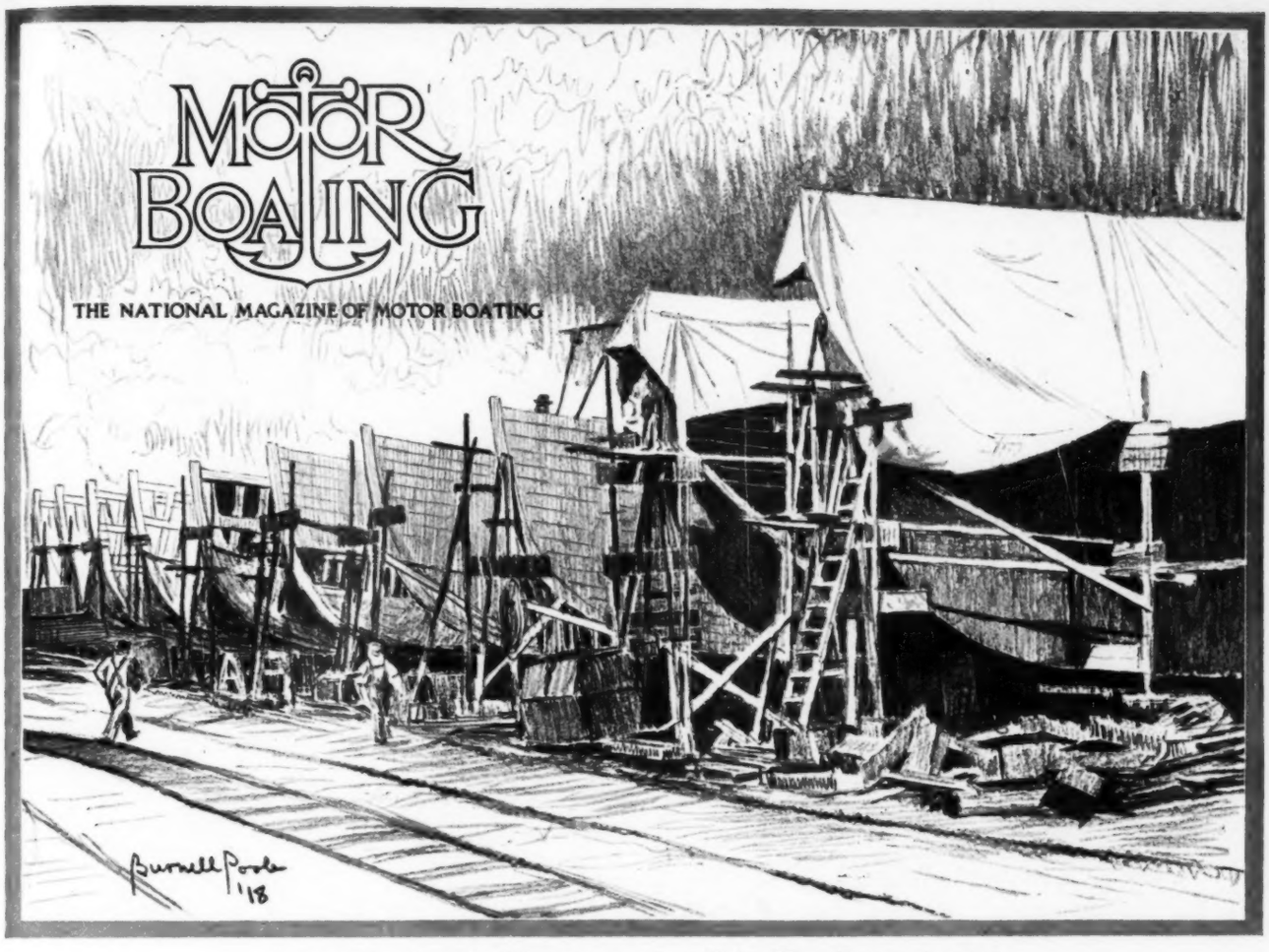


A row of the chasers in different stages of completion "Somewhere in America"

More Boats to Fight Submarines

The First Lot of Submarine Chasers Now Completed and Plans Announced for More and Bigger Boats—More Motor Craft Probable

By Charles F. Chapman

LAST spring, a few days after the declaration of war against Germany, the writer was called to Washington and while in consultation with officials of the Navy Department he was shown the plans for the new 110-foot submarine chasers which the Department had that day approved. He was given the first authentic description of the chasers which had been allowed to reach an outsider. Thus it came about, as will be remembered, that MoToR BoatinG was the first to publish a complete description of the plans of the Navy Department for meeting the U-boat menace by means of motor boats. This appeared in our April issue, together with full plans of the 110s. Since then much has happened which has influenced certain officials in the Navy Department for or against their original program for fighting motor boats.

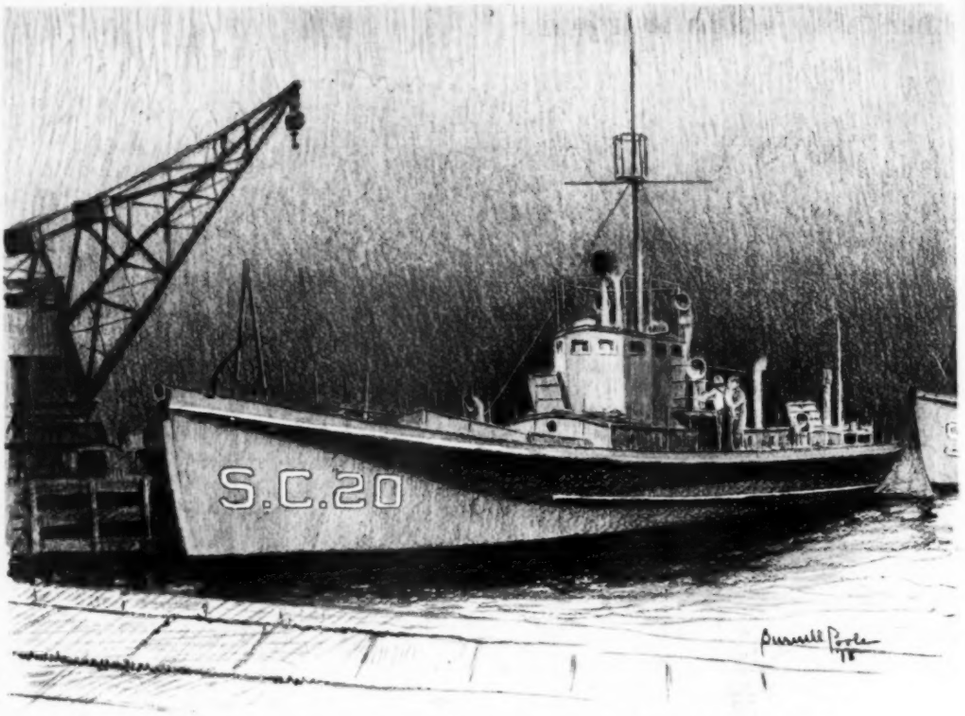
MoToR BoatinG from the first has held that the Navy Department plans for chasers was correct as far as they went and that the 110s would be the best boats of their kind ever produced. For what they were originally intended it would be impossible to get a better little ship, but the tendency on the part of the Department, the public and even the crews of the boats would be to expect too much. That they were small boats at their best was our contention and would never be able to clear the seas of enemy submarines. Ability to construct and build the original 110s in quantity in short order was their most essential and promising advantage. But as a submarine destroyer the fundamental fault with the chasers was that they were to be too small. This we publicly stated in the face of much opposition. The apparent success of the several hundred American-built 80-foot chasers for the British Government, completed more than a year ago, had led many to assume that those boats were all that could be desired and their type and design should be followed in our own Naval program.

Now that a majority of the 300 odd 110-footers contracted for by the Navy Department last spring have been turned over by the builders to the Department and have been put into service, including some fifty being sent abroad and at this moment on patrol duty off the coast of France, besides the many patrolling our own inshore waters, the officials have had a chance to observe their performances and adaptability for the service for which they were originally intended.

Before many months there will be many more of the 110s on their way across the big pond. Just at present the hundreds of men in the United States Naval Reserve Force who are assigned to the "S. C.'s", as they are officially called, are undergoing the most intensive training to prepare themselves for the hard service which is ahead of them. The boats are being fitted with the latest known devices for detecting and combating the undersea boats.

The conclusions of the Navy Department were outlined to the writer by a high Naval official in Washington early in February. He stated that of all the Naval building pro-

gram which this country is now carrying out that of the submarine chasers has been the most successful. We are spending $30,000,000 for chasers and the work calling for this enormous expenditure has gone along without a hitch. In a few instances the Government has had to take over the boat yards and practically build the chasers themselves, but in most cases we have found the motor boat builders capable and thoroughly able to do the work without assistance on our part. It was really more than we had expected, for we had been given to understand by some in the industry that many builders would never be able to even lay the keels. The capable inspectors which we were able to obtain for this work from the ranks of the civilians have been of inestimable value. Ordinarily when the Government lets a contract it is not expected to teach the contractor how to do his work, but to facilitate the completion of chasers our inspectors in many instances were able to render the builder much valuable assistance and advice. As a result we have the finest fleet of small war boats which any nation could desire. Taken as a whole, the boats have been delivered on time. In a few instances there have been delays, but none of serious moment.



One of the 110s about ninety per cent. complete. The guns, wireless, depth bombs windlass, microphones, ammunition, stores, etc., are yet to be put aboard

In service the boats have proven very seaworthy and the main motors and the auxiliary engines are reliable and satisfactory. That the one concern which supplied all the motors—over 1,000 in all—could do the work with so few failures or faults is certainly remarkable. (This concern is the Standard Motor Construction Co., of Jersey City, N. J.)

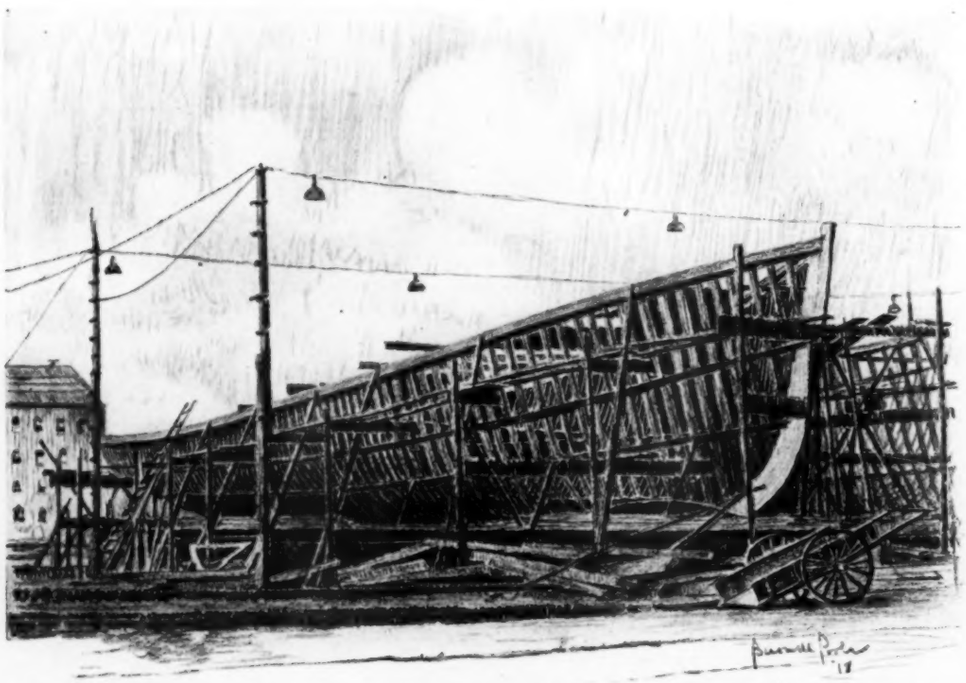
"But now that most of the 110s are completed and many of the boat yards idle," continued the writer, "how about future plans of the Department for more chasers?"

The official would not answer this question directly. He simply smiled and said perhaps we will and perhaps we won't—we really don't know. We may decide to-morrow to go ahead with more chasers and again we may never build more.

However, the success of the first lot of 110s and the favorable impression which they have made upon high officials in the Navy Department has a significant meaning.

"But I can tell you something of interest"—and then he related the plans for a new type of chaser, and once again MoToR BoatinG was the first to get the information and give it to its readers.

The new boats, strictly speaking, are not motor boats at all, yet they should be of interest to all motor boatmen as they are so closely allied to the craft in our own field. The department has concluded the 110s are too small for real out-and-out submarine chasers. For scout and inshore patrol duty they could hardly be improved upon and we will need thousands of such boats. But for the actual work of chasing and sinking subs the joke might be the other way around. The cruising radius at full speed of the present chasers is too limited, their speed at sea far short of the necessary, and their ability to stay out at sea on their station for indefinite periods is lacking. Even for coastwise work seventy-two hours is about the limit of the physical endurance of the crew on the present 110s, as recent winter experiences have shown.



One end of a row of twenty or more chasers in frame in one of the yards on the Atlantic. Standardization is the watchword on this job, and by working twenty-four hours a day the boats were turned out in quick order

The new boats are to be 200-footers, which will give them five or

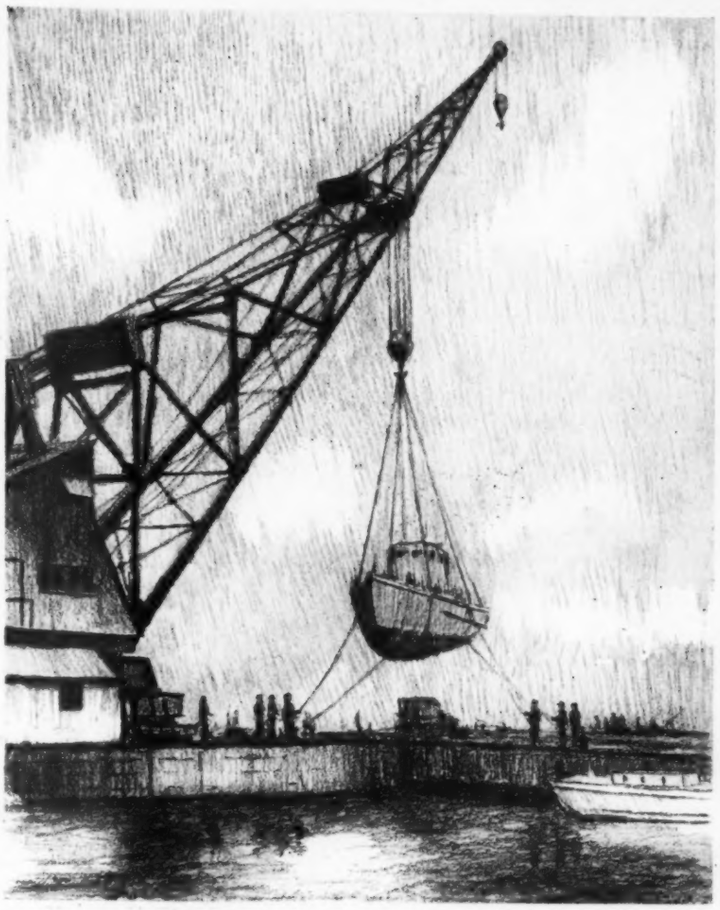
six times the capacity of the older boats. Their speed will be about 19 knots and they will be driven by steam turbines, single screw, and their boilers are to be oil burners. The hulls will be of steel, built by Henry Ford at his automobile factory at Detroit.

Standardization in its strictest sense is to be the keynote of the new chasers. Every part will be standardized and built by the most up-to-date machinery in the world. Special production methods will be employed by Ford, which will be worked out by his own force. However, as far as the design of the hull or machinery is concerned, these are the result of our own Navy Department, the Bureaus of Steam Engineering and Construction and Repair. It is stated that the other Allied Naval authorities were consulted and many of their suggestions have been embodied in the design.

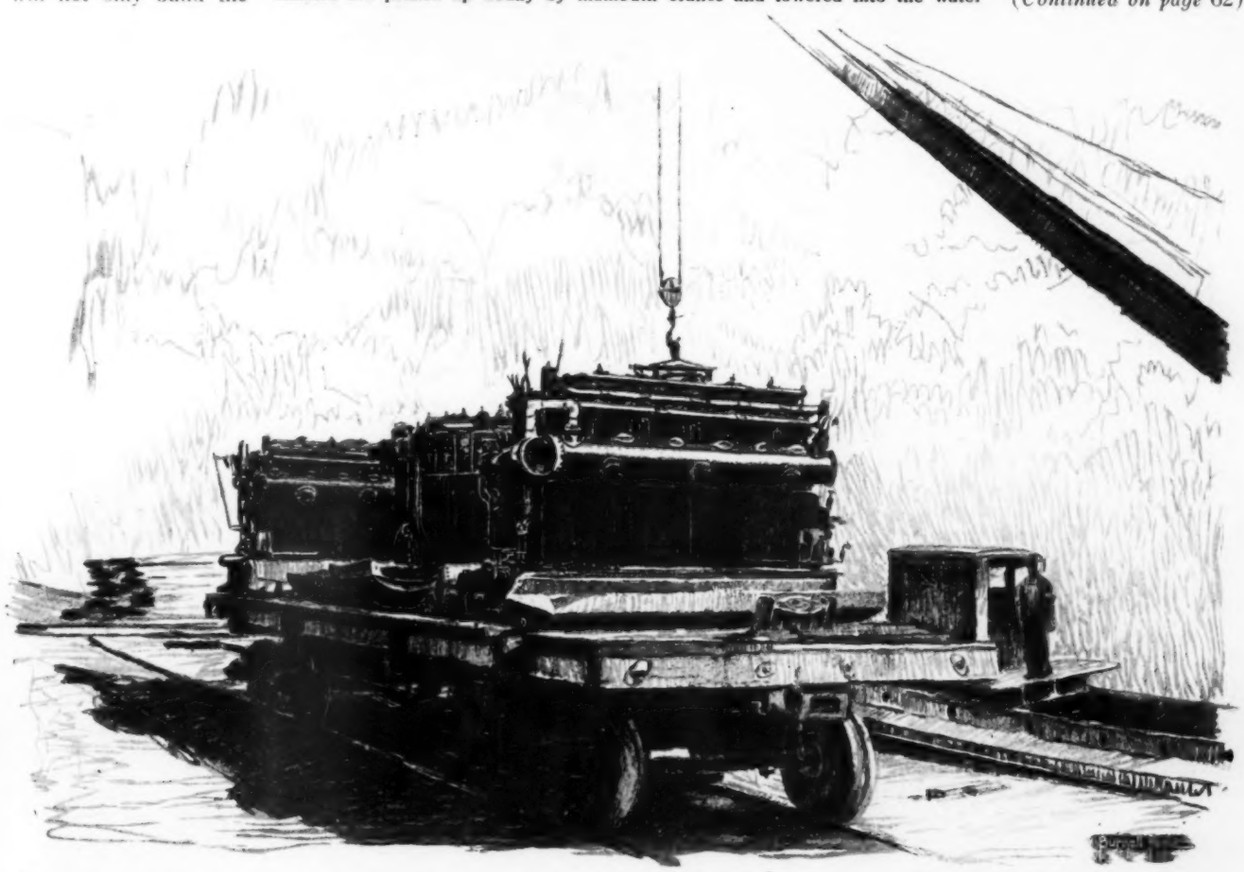
As to total numbers, there is nothing definite. Surely there will be hundreds and perhaps thousands. The Ford plant will not only build the hull but will also manufacture much of the propelling machinery, auxiliaries and other equipment, although there will be considerable of the equipment and certain parts of the main power plants which Ford will not attempt other than the assembly. In a word, Ford's brain and ability will be used for standardized production only; that he knows little or nothing about boat design or building will not interfere in the slightest, as the best talent of the Navy Department, with what assistance the motor boat and engine building industry cares to give, will supervise all details except those of production.

We cannot but commend these, the most recent plans of our Navy Department. To those who really know it is no secret that to annihilate the U-boat is going to require boats of almost the Destroyer calibre. Destroyers, besides being very costly, require a long time to build and equip which prevents their universal use in sufficient numbers to be effective.

(*Continued on page* 62)



Instead of the usual laborious and slow method of launching small craft, these chasers are picked up bodily by mamouth cranes and lowered into the water



The power plant for one chaser. The three 220 h. p. Standard motors are brought on a flat car right alongside the boat in the water. It is then only a few minutes' work to lower them into place

Spring Axioms

IT can be truly said that in no other sport is there as much energy expended, preparatory to the season's fun, as in boating.

While in the main the duties connected with the spring overhauling are most enjoyable, there are certain features that produce quite the contrary effect.

If, instead of expending much excessive and oftentimes needless energy at springtime in correcting the effect produced by the elements, a few moments now and then were spent throughout the season in preventing such possibilities, the task of fitting out would become simple indeed.

So simple is it, in fact, that often but a day and a half will suffice to enable one to prepare his boat for the water.

Incidentally, such a craft always looks as well as any in the fleet; the secret being that its condition is never allowed to become impaired.

When a man begins to take pride in the proper maintenance of his boat by keeping things shipshape and Bristol fashion, as the saying goes, he then realizes that a new and added charm has been discovered.

As the readers of MoToR BoatinG are, no doubt, conversant with the details of each successive step in connection with the fitting out of their craft, let us view the matter from a different angle by determining to what extent we may simplify the work, and how best we may keep the ship in proper shape.

The time to clean the underbody is immediately after the boat is hauled out, or even during the process. It is then that the barnacles, scum and whiskers may be removed with the least expenditure of effort.

Whether two coats of copper are necessary in the spring is a matter of some doubt, for when the boat is hauled out or beached in mid-summer for cleaning and repainting, the benefits from the second application sometimes seem negligible.

Occasionally we hear of the desirability of first appling a coat of red lead to the bottom in order to preserve the wood. A better plan would be to give her a coat of copper in the fall, thus offsetting to a degree the tendency the weather has of opening up the seams.

Many old-timers contend that nothing but anti-fouling paint should ever be applied to the bottom, even when the craft is brand new.

Under ordinary usage cedar plank will last a lifetime, but if the boat is allowed to remain hauled out for an indefinite period, improperly protected from the elements, then a coat of lead and oil becomes a necessity.

The earlier you put your boat overboard, the better, for more harm is done by subjecting it to the warm dry winds of springtime than is fully realized.

A few buckets of water should be heaved aboard and sloshed well up in the bilges and at both ends. This will relieve you

By
F. T. Lander

to a large degree of the monotony of pumping out after she goes overboard.

To further retard the seams from opening, it is best to wait until the boat is launched before throwing everything wide open in order to dry out the interior, for it is the boat subjected to extremes of moisture and dryness that suffers the most.

When it comes to the topsides we find that white and gray are the two predominating colors. The latter is popular among certain classes for two reasons: first, because it is the practice among naval vessels, and second, because it does not readily show the dirt.

If gray is adopted it would seem more harmonious, as well as shipshape, to paint with some other color such parts as the rail, skylight, companion slide, etc., rather than to varnish them as is done at times. Gray topsides and varnish trim seem incongruous. It is like wearing a high hat with overalls.

Topsides of white always have been and probably always will be the universal color.

Many a man starts the season with glistening topsides of white only to neglect his craft to the extent that it soon becomes streaked and mottled with grease and dirt, becoming more so as the season advances.

The first duty at springtime in connection with the topsides is to thoroughly clean the paint with fresh water (warm preferred) and soap-powder, using a rough cloth or a handful of waste with which to do the scrubbing.

If the surface is in fairly good shape, touch up the scarred and discolored portions with a thin coat of white, and putty seams or digs that may need attention. Perhaps it will then be found that one entire coat will be sufficient to complete the job.

Paint is too often applied to the topsides for the sole purpose of covering up dirt.

Where topsides become soiled between coats, due to rain running off a dirty deck, remove the blemish with soap and water rather than attempt to paint it out as some do.

As to the kind of paint best adapted to topsides, this is somewhat a matter of individual taste, but from the standpoint of all around service it would seem that a lead or zinc and oil mixture, free from varnish, will give the best results.

Several good brands may be obtained from reliable manufacturers who are familiar with marine work.

Some boatmen prefer a straight mixture of turps and white lead. This dries very rapidly and it is possible to apply two coats on the same day; but owing to the fact that it lacks body it becomes necessary to use three or four coats to produce the desired effect.

As to the deck, a lavish application of

(*Continued on page* 55)

Practical Navigation for the Motor Boatman

Correction of Observed Angle
Conversion of Time
Celestial Sphere
Index Error

By W. Mack Angas

IN SEVEN PARTS—PART V

Latitude By Solar Observations
Combined Corrections
Greenwich Time
Mean Time

THE position of a vessel as determined by nautical astronomy can not be accurate if the "sights" from which the position was calculated were inaccurate. Because of the vital importance to the navigator of the correctness of his sextant observations a few words will be added to what was said last month on the subject of using the sextant. This additional matter deals purely with the sextant as a precise astronomical instrument and takes into consideration refinements unnecessary for the measurement of horizontal angles in pilotage.

In all modern methods of position finding the angle measured when a "sight" is taken is the vertical angle between the horizon and the body that is being observed, this body in a majority of cases being the sun. In other words only vertical angles are measured with the sextant in modern nautical astronomy, for the accuracy and reliability of modern chronometers has rendered obsolete the method of determining the Greenwich time by Luna Distance. Some advanced amateurs may care to test their skill by attempting the "Luna," and such as plan to do this will find the process of computation and the method of observing the angles between certain stars and the moon fully described in old copies of Bowditch. No less an authority than Captain Lecky has branded the "Luna" as a thing of the past in practical navigation so it will not be described here. Because the method of taking the sun's altitude is the same whether the data is to be used in calculating latitude, longitude, or the azimuth of the sun; the process of taking a sight and correcting the observed altitude will be described but once, and that independently of the discussion of the determination of latitude or longitude.

In order to measure the altitude of the sun, or the vertical angle between the sun and horizon the beginner is advised to proceed as follows: Screw a plain sight tube (not a telescope) into the carrier on the sextant. Swing a medium shade glass into position between the index mirror and the horizon glass, and see that all of the other set of shade glasses are swung out of the line of sight through the sight tube and the clear part of the horizon glass. Clamp the arm near zero. Take the sextant by its handle and with the plane of the instrument as nearly vertical as it can be held point the instrument at the horizon directly below the sun. The horizon can be seen through the clear part of the horizon glass, and the silvered part of the glass will look black as in it will be seen the reflected image of the shade glass in use. If the arm be unclamped and pushed very slowly forward the sun should appear in the silvered side of the horizon glass as a bright disc of the color of the shade glass. Beginners find it difficult to pick up the sun in the horizon glass, but a little practice should enable one to overcome the difficulty. The sun can be readily enough found if the arm be moved very slowly and the sextant swung a little from side to side so as to sweep the part of the horizon below the sun. When the sun has been found in the glass the brightness of the image should be noticed and if this is in the slightest degree dazzling a darker shade glass must be used. All preliminaries being now finished the actual taking of altitude can be proceeded with. Clamp the arm with the lower edge of the

A group of students of navigation practicing with sextants. The men are not using a sea horizon, but are taking the altitude over a horizontal line on a building. This is just to get practice in using the instruments as the sights are valueless as such. The men check each other

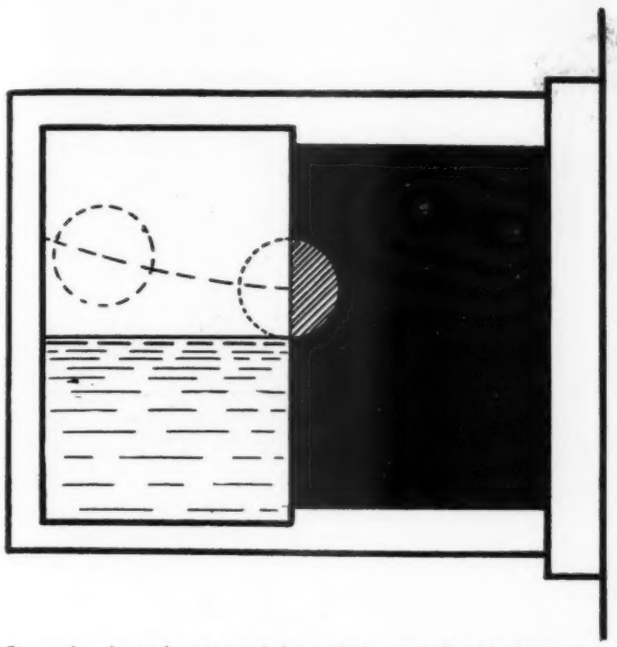


Figure 1. A good contact of the sun's lower limb with the horizon as it looks in the horizon glass of the sextant. The dotted line and dotted outline of the sun show how the sun sweeps out an arc as the sextant is tipped slightly from side to side. The sun should just kiss the horizon at the lowest point of the arc

sun's reflected image resting approximately on the horizon and then with the tangent screw bring the lower edge, or lower limb as it is called, of the disc into accurate coincidence with the horizon. If the instrument be tipped slightly from side to side the sun's image will sweep out an arc and the ideal condition is to have the sun just touch or "kiss" the horizon at the lowest point of this arc. An experienced hand can get a satisfactory "contact" when the line between the clear and silvered parts of the horizon glass bisects the sun's disc, but such nice work requires practice. As soon as a satisfactory contact is obtained the vernier is read, this reading giving the observed altitude of the sun's lower limb or as it is written in the symbols of nautical astronomy "Obs. Alt ☉." Though this proceeding may have sounded complicated to the reader, it will be assuring to learn that with a little practice it is easy to take a series of observations with the individual sights not more than twenty or thirty seconds apart. Two students can get excellent practice if they are fortunate enough to possess two sextants by taking altitudes simultaneously and checking results after applying the index corrections of the sextants to the observed altitudes. When the sextant can be easily handled when fitted with a sight tube, the low power telescope should

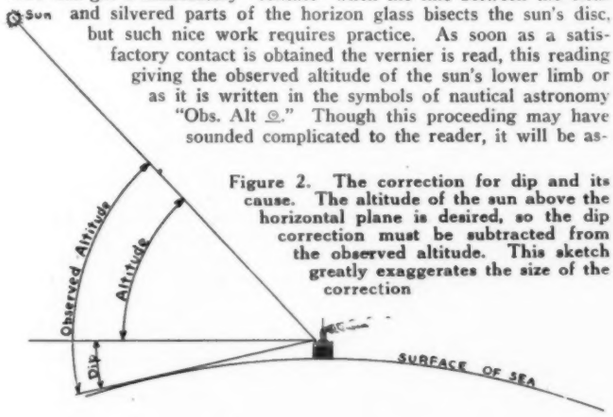


Figure 2. The correction for dip and its cause. The altitude of the sun above the horizontal plane is desired, so the dip correction must be subtracted from the observed altitude. This sketch greatly exaggerates the size of the correction

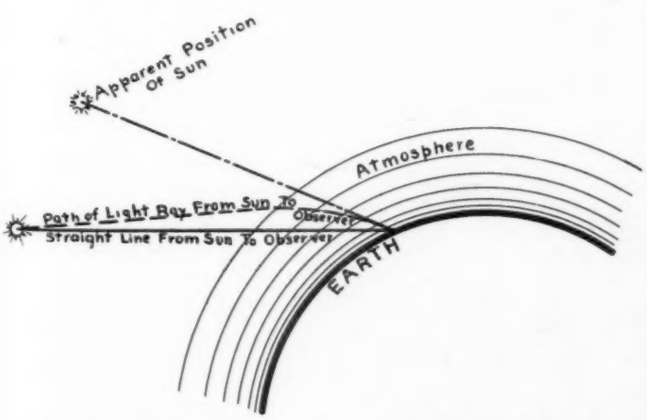


Figure 3. The correction for refraction and its cause. The light rays from the sun are bent as they enter the atmosphere just as light rays are bent when they enter water, glass, or any other transparent substance denser than air. The apparent bend in an oar at the water line is due to refraction. This sketch shows how refraction makes the sun look higher than it really is and therefore makes a subtractive correction necessary

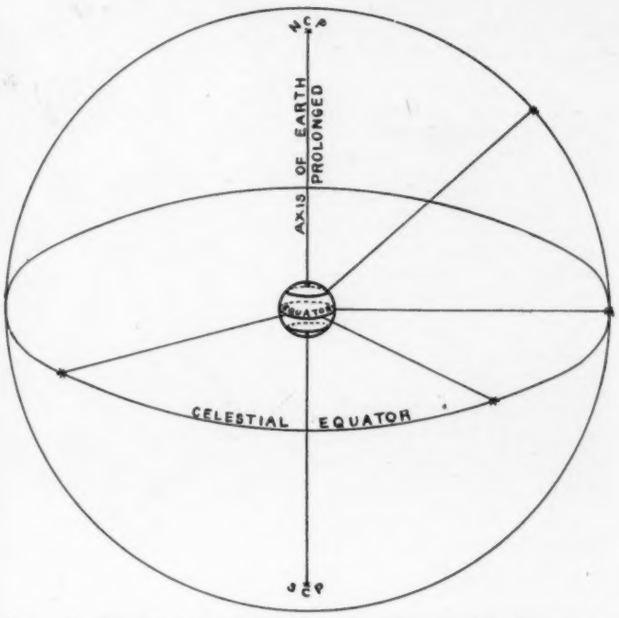


Figure 4. The imaginary celestial sphere. The celestial sphere is an imaginary device used to simplify the analysis of astronomical problems. The sphere is supposed to surround the world as shown, but to be of infinite radius, a condition that can not be illustrated. All heavenly bodies are imagined to be fastened to the inner surface of the sphere or to move in definite paths on this surface. Note that the celestial poles are directly over the terrestial poles and the celestial equator directly over the equator. The latitude of a point on the earth is always equal to the declination or celestial latitude of the point directly overhead, which is called the zenith. The north celestial pole is marked N. C. P. and the south celestial pole S. C. P.

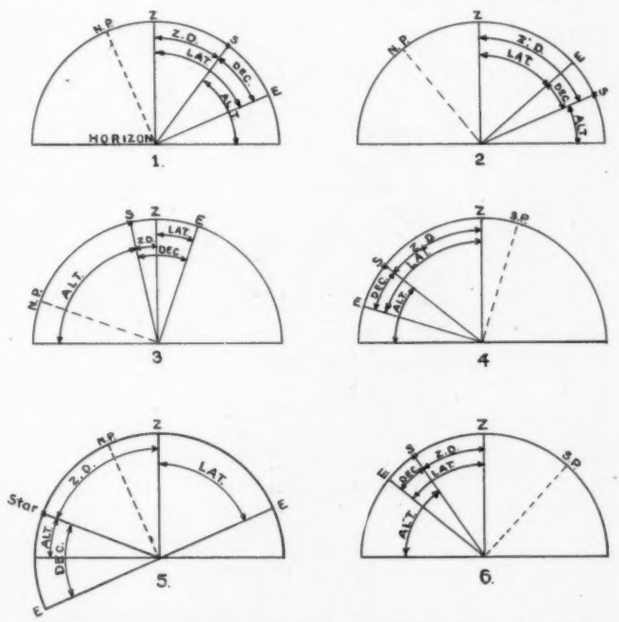


Figure 5. The kind of simple sketch used by some navigators in working latitude. In all cases the observer's horizon and not the equator is the base. The observed altitude is corrected and the corrected altitude subtracted from 90°, this gives the zenith distance Z. D. After the position of the observed body S has been located the equator can be located by laying off the declination in the proper direction from S. This is not a graphical method of solution, for the sketches merely indicate whether the zenith distance and equator have to be added or one subtracted from the other. In diagram 1 the sun is bearing south of the observer and the declination is a northern one, the latitude being northern. Diagram 5 is a sight of a star on the meridian below the pole or a sight of the mid-night sun. Other diagrams illustrate possible cases with the sun. 1 and 2 only can occur in North America

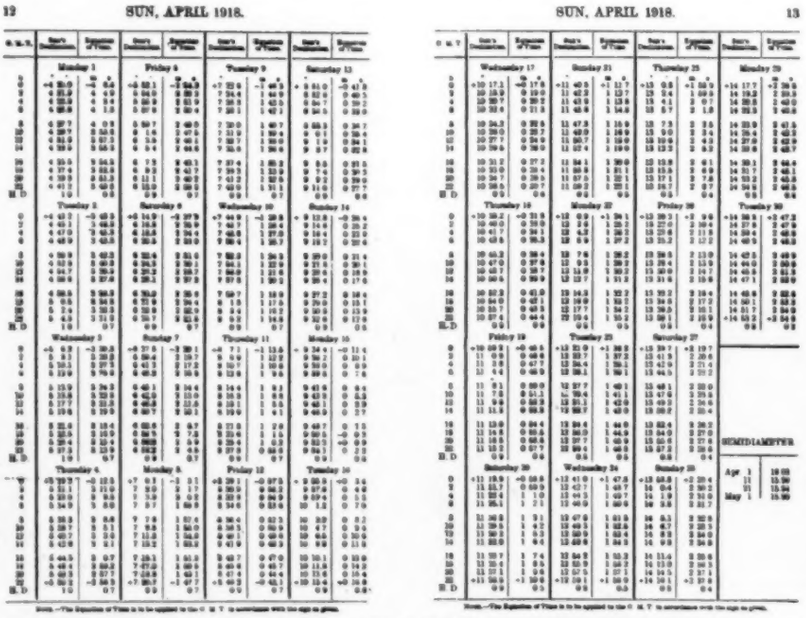
be tried. It is a good deal harder to find the sun in the horizon glass with a telescope than with the sight tube, but the image when found is larger and therefore more accurate work can be done, provided the glass be sharply focused.

The observed altitude of the sun's lower limb as read from the sextant is not the true altitude desired for astronomical computations. The true altitude is the angular altitude of the center of the sun above a theoretical horizon which is a horizontal plane through the eye of the observer, who is in theory supposed to be located at the center of the earth. This true altitude is obtained by the application of certain corrections to the observed altitudes; the corrections being known as: the index correction of the sextant, the semi-diameter of the sun, the dip of the sea horizon, refraction, and parallax. Taking these corrections in order, the reader will remember that index error and the determination of the index correction of a sextant were discussed last month, but a reiteration of the most practical method of determining index correction will not be out of place here. To find the index correction quickly and with sufficient accuracy for all ordinary purposes of nautical astronomy equip the sextant with a sight tube, swing all shade glasses out of position, and with the arm clamped at zero sight at the horizon or any *far distant* horizontal straight line. By turning the slow motion screw, make the reflected image of the horizon as seen in the silvered half of the horizon glass coincide with the horizon as directly seen through the clear part of the glass. When the coincidence is perfect read the vernier. If the zero of the vernier lies to the left of the zero of the arc the correction is directly read from the vernier and is a minus correction or, in other words, is to be subtracted from observed altitudes. If the zero of the vernier lies to the right of the zero of the arc the reading of the vernier must be subtracted from the total number of minutes represented on the vernier scale and the resulting correction is a plus correction and is to be added to observed altitudes. This method of finding a plus correction should be thoroughly mastered. Suppose the arc of a sextant were cut to twenty minutes or had thirds of degrees marked on it and that the half minute vernier of the instrument read 18′ 30″ with the vernier's zero just to the right of the zero of the arc; the value of the entire vernier scale would be 20′ 00″ and the index correction would be 20′ 00″ minus 18′ 30″ = plus 1′ 30″. Where greater precision is desired a slightly more accurate result may be obtained as follows: Equip the sextant with either a sight tube or telescope, preferably the latter, and swing a dark shade glass into position between the index and horizon glasses and a dark glass of another color into position in front of the horizon glass. Measure the sun's diameter by sighting at the sun and bringing the reflected image into contact with the directly viewed object. The two images must not overlap, but must just be tangent to one another, or in the words of the old-timer, the images must kiss. When the contact is satisfactory with the reflected image above the other image the vernier reading, which will be "off the arc," is to be noted. A second contact of the images with the reflected image below the other will give a reading of the vernier "on the arc" and one-half the difference of the two readings is the index correction. The sign of the index correction is determined by which reading is the greater. If the reading "off the arc" is larger than the other, the correction is a plus one and vice-versa. This method of determining index correction is explained on page 95 of Bowditch, and the explanation there given is correct. Note carefully that Bowditch says "the index correction is one-half the algebraic sum of the readings," or according to the formula on the same page the index correction, $R = \frac{1}{2}(r + r')$. As the reading off the arc is a minus reading according to the mathematical notation of Bowditch the rule and formula on page 95 are equivalent to the rule given in this article. This more or less complicated method of getting index error should always be checked by the previously given simple method to guard against huge errors and a further check on the accuracy of the observations may be had by adding the two readings and seeing whether one-half the sum of the two equals the semi-diameter of the sun tabulated in the nautical almanac, which it should do.

Sextant prepared for taking an altitude of the sun. One shade glass is swung into position between the horizon and index glasses and all shade glasses of the other set are out of the way. When the index error is to be determined by measuring the sun's diameter on and off the arc one shade glass of each set is used, but the glasses should be of different color. If it is necessary two glasses of the same set may be used to protect the eyes from a brilliant sun

The next correction to be applied to the altitude is the semi-diameter of the observed body. The semi-diameter of the sun, which is the body most frequently observed in simple navigation, varies slightly from 16′, the exact diameter depending upon the time of the year. Values of the semi-diameter of the sun will be found tabulated for each ten days of the year in the lower right hand corner of the odd pages of the nautical almanac. The sample page of the nautical almanac reproduced as an illustration shows how the semi-diameter is given. The correction for semi-diameter is to be added to the altitude when the sun's lower limb is observed, because it is the altitude of the sun's center that is desired and in order to bring the center down to the horizon the arm of the sextant would have to be moved further forward than if the lower limb only touched the horizon. The further movement of the arm would increase the vernier reading by the amount of the sun's semi-diameter. The further movement of the arm is not made in practice, because the semi-diameter is added to the observed altitude of the lower limb. Greater precision is obtained in this way than could possibly be obtained by bringing the sun's center to the horizon, a proceeding that is never attempted because of the impossibility of getting the desired results. When for any reason the upper limb of the sun is observed the semi-diameter must be subtracted from the observed altitude of the upper limb. No correction for semi-diameter is necessary with star sights. The next correction on the list is the dip of the sea horizon or simply the "dip," as it is commonly called. This correction is necessary because the sun's lower limb is brought into contact with the visible sea horizon instead of the invisible theoretical horizon, which is a horizontal plane through the eye of the observer. Figure 2 explains the correction and shows why it is a subtractive one. The amount of the dip correction is found from table 14 on page 685 of Bowditch. To find the correction look for the height of the observer's eye above the water in feet in the left hand column of the table and take the correction from the right hand column. Table 14 applies only to the true sea horizon and not to a junction between land and water, which must be handled by table 15. Refraction is the error in observed altitudes due to the bending of the light rays as they enter the atmosphere of the earth from the rarified atmosphere that exists beyond the limits of the known atmosphere. Figure 3 shows how this bending of the rays causes the sun to appear higher up than it really is and therefore necessitates a subtractive correction. Table 20A gives values for the refraction cor-

(*Continued on page* 56)



12 SUN, APRIL 1918.

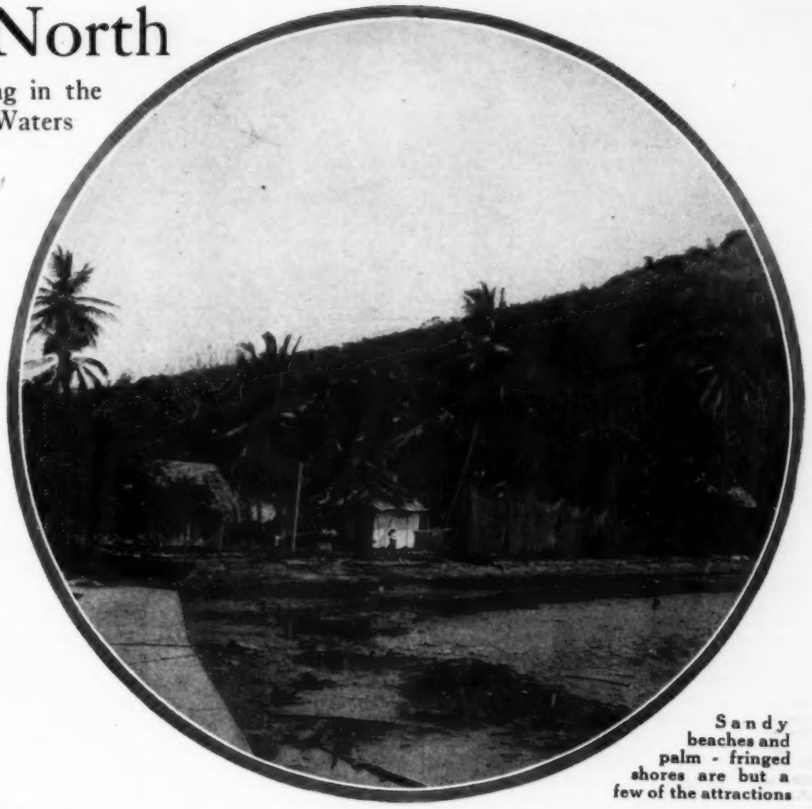
SUN, APRIL 1918. 13

Figure 6. A page from the nautical almanac. The table of the sun's declination and the equation of time. This is the most used table in the almanac and is the only table used in working the common sights of the sun for latitude and longitude excluding the tables in Bowditch.

Ten Degrees, North

The Possibilities of Motor Boating in the Gulf of Paria and Other Tropical Waters

By A. H. Verrill



Sandy beaches and palm - fringed shores are but a few of the attractions

SURROUNDED on every hand by land, the only inlet or egress to the open sea —the narrow Bocas at north and south— the great Gulf of Paria offers an ideal spot for motor boating. Tranquil as an inland lake, hemmed in by marvelously luxuriant tropic shores, its waters teeming with fish, forests and swamps which border it filled with game and with a busy up-to-date city upon its shores, this gulf, which separates Trinidad from the mainland of South America, possesses a combination of attractions and advantages which should prove a lure to motor boat enthusiasts.

From the Bocas del Drago, at the northern end of the gulf, to the Bocas del Serpiente, or Serpent's Mouth, at the southern extremity, the Island of Trinidad stretches in a succession of towering mountains, green hills and broad plains and valleys of wondrous green for nearly seventy miles. Some ten miles from the northern Bocas lies the capital, Port of Spain, and from this town every interesting spot along the shore may be easily reached even in small motor boats. Port of Spain itself is a big, well-built and beautiful modern city, with broad, straight streets, charming parks and shaded avenues and innumerable shops and stores, where one may purchase anything and everything that can be found in the great cities of Europe or America.

There are excellent hotels in the town and innumerable boarding places, so that it is not necessary to possess a large cruiser or to live aboard one's craft in order to enjoy cruising on the gulf. In fact, one may spend many delightful days upon the waters and along the shores of Trinidad without having one's own craft, for there are many excellent motor boats and cruisers owned by the inhabitants of Port of Spain, and a number of these are rented out by the hour, day or trip at reasonable rates. But a great deal more real enjoyment may be obtained by owning one's own boat, and as the Trinidad Line of steamships run direct from New York to Trinidad, and will carry motor boats on deck at very low rates, one can put a boat in commission as soon as the ship arrives. Then, when ready to leave, the boat may be shipped back to New York, or it can be sold readily at a price sufficient to cover the value of the craft and the freight charges in addition. In fact, if the boat has demonstrated its reliability it is often possible to dispose of it at such an advance over its value in the north that the profit covers the trip down and back, and the expenses incidental to operating the boat while at Trinidad in addition. The greatest expense of running a motor boat in the West Indies is the cost of fuel. Gasoline is very high, but in Trinidad it is lower than elsewhere, as it is manufactured locally from the island's petroleum, but in the West Indies nearly all motor boats are operated on kerosene, and any one bringing a boat to these islands should have the engine equipped with a carbureter adapted to this fuel.

There are excellent mechanics and machine shops at Port of Spain, and supplies of all kinds may be obtained, so that, unlike many of the islands, there is no danger of being laid up for weeks at a time while waiting for repairs or supplies to be sent from New York. Many of the boats in use on the gulf are built locally, for there are excellent shipwrights and boatbuilders at Port of Spain, and one need have no fear of any contingency arising which cannot be met promptly and extremely cheaply in Trinidad.

If you have a good-sized cabin boat your field for cruising in the gulf is almost unlimited. Aside from the fascinating coast of Trinidad there is the wild, almost unknown continent across the gulf, where the great forests, the vast swamps and the mighty rivers of Venezuela present a wonderland for those fond of exploration or adventure, and which are a veritable sportsman's paradise. Much of the Venezuelan shore of the gulf is uninhabited, save by semi-savage Indians, who earn a livelihood by hunting and gathering balata rubber, but they are all peaceable and friendly albeit as primitive as in the days when Columbus first sailed through the gulf in his quaint caravals.

All along this Venezuelan shore are deep lagoons, sluggish streams and mysterious mangrove swamps, which are navigable for light draft craft and motor boats drawing not over three feet may cruise far into the forests and through the jungle. One should not attempt this without a competent guide, however, for the streams wind about, join and meander through the forest and are often indistinguishable from the surrounding swamps, and the whole forms a perfect labyrinth in which a stranger may easily become hopelessly lost. Although these coastal forests of the continent are called swamps, yet they should not be confused with the miasmatic, unhealthy swamps of other places, for the water is salt and the so-called swamps are merely broad shallow bays, often stretching inland for fifty miles or

Waterfront at Port of Spain, where the possibilities for the use of motor boats is unlimited

A boat yard at Port of Spain

The narrow Bocus which separates Trinidad from Venezuela

more, in which mangroves and other trees have found a footing and have grown into a vast forest. In these and in the "bush" of the higher land which borders them, game of all kinds abounds. Bird life is especially abundant and tree ducks, muscovy ducks, ibis, curassows and pigeons afford excellent shooting, while egrets, herons, spoonbills and scarlet ibis are still undisturbed by the plume hunters, and toucans, parrots, macaws and brilliant colored birds of innumerable species are seen everywhere. Here, too, one may hunt the great water-hogs, or Capybara—a sort of guinea-pig as large as a small calf, and excellent eating, as well as tapirs, deer, ocelot and even the jaguar, or South American tiger. Troops of spider monkeys may be seen swinging from branch to branch and chattering at the strange intruders on their domains, and the great howling monkeys make night hideous with their weird cries, while great crocodiles bask upon the banks. To penetrate these wilds in a motor boat is a strange and unique experience, and one feels as if motor boating in some stupendous zoological park. If one cares to see more of the continent it is an easy matter to cross the Gulf of Trinidad, enter the mouth of the Orinoco and continue to Ciudad Bolivar, to which important inland port steamers run regularly from Port of Spain.

To the motor boat owner fond of fishing the gulf will also prove most attractive, for fish are abundant and cavally, tarpon, bonito and many other game fish afford excellent sport, not to mention the huge groupers, which often attain a weight of one hundred to one hundred and fifty pounds.

But even if one does not care for fishing or hunting, if one has no desire to go a-motor boating through the jungle, or is not in the least interested in the bird or animal life of the tropical forest, there are still ample attractions about the shores of the Gulf of Paria. Within a short distance of Port of Spain are the beautiful Five Islands, charming, picturesque islets covered with tropical verdure, with sheltered coves and sandy bathing beaches shaded by nodding cocoanut palms, and with attractive bungalows and cottages, which may be rented furnished if desired. Beyond the islands lies the almost landlocked Bay of La Chaguanamas, where is situated the great Government drydock, and all about are verdure-covered islands, lofty green hills rising from the waters, bold-faced cliffs, hidden coves of fairy-like beauty, snowy, sandy beaches and palm-fringed shores. Still further north are the Bocas — narrow waterways which connect the gulf with the Atlantic, and separated by towering green-clad mountains with precipitous red and yellow rocky shores.

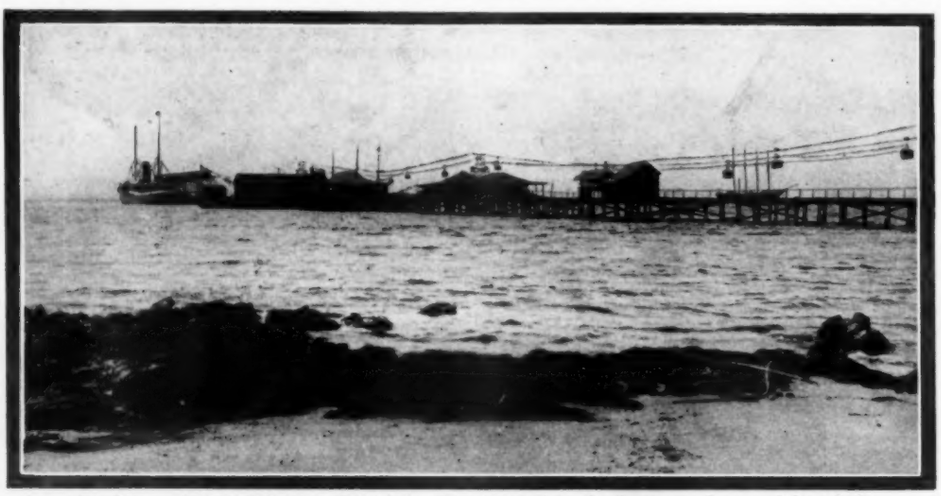
Many of these cliffs are worn into strange fantastic shapes by the action of the sea, and in the bases of some are great water-filled caverns leading far into the mountains above. Here dwell countless numbers of the Guacharo bird—a strange night-flying creature considered a great delicacy by Trinidadian epicures, and so fat that by running a string through their bodies the natives make use of them as candles.

Outside the Bocas the Atlantic surges may pound in foaming surf upon the rocky shores, and yet within the gulf the waters are calm and smooth, but oftentimes the ocean is lulled to sleep beneath the tropic sun, and even small motor boats may venture forth upon its bosom and visit the northern shores of the island.

Southward from Port of Spain are scenes and spots as attractive in their way as those to the north. Here the lofty hills and higher mountains give way to broad, level plains covered with waving cane fields and great groves of cocoanut palms, while rivers flow between jungle-covered banks to the gulf. Several of these streams are navigable for motor boats for several miles, and as they teem with water fowl and alligators they afford good sport to those who like hunting from a motor boat. Some thirty miles south of Port of Spain lies San Fernando, at the foot of Naparima Hill, a quaint old town, and the port of the principal cane district of the island. Here one seems to step out of America and into the Orient, for the bulk of the inhabitants are East Indians—coolies, as they are called—who were brought from India as indentured laborers and who live their lives, follow their customs and wear the dress of their race exactly as if in India itself. Everywhere the Hindus are seen about San Fernando—gaunt, turbaned field hands clad in little save a breech-cloth and a black skin; Brahmin priests in flowing, spotless robes; parsees, with strangely painted faces; fakirs, thin as skeletons, and clad in rags and begging alms; prosperous merchants, dressed in Oriental silks, huge turbans and jewelled ornaments and driving in motor cars and countless women laden with nose rings, anklets, bracelets and armlets of gold and silver, and tripping along, clad in clinging, filmy lace and silken scarfs. But of even greater interest perhaps is Brighton, or La Brea, still further down the gulf. Here the long pier of the asphalt company projects for nearly a quarter of a mile into the gulf, for Brighton is but a stone's throw from the famous Pitch Lake, the greatest and most famous of Trinidad's resources.

It is an easy, though hot, walk over the low hill from Brighton to the Pitch Lake, but it is well worth the trouble, and while the visitor may be disappointed in discovering it is neither a lake nor pitch, yet it is just as interesting, and is really worthy of being classed among the wonders of the world.

Just over the brow of a low hill it lies, a broad, level expanse of some one hundred acres in area and looking like a half-dried pond with black mud projecting here and there through stagnant water. About its shores and upon its surface grows rank grass and small shrubs, and over it extends roughly-laid, irregular railway lines. Upon the rails stand trains of small cars and groups of negroes are busily digging at the black substance and piling it in waiting cars. But the dark material, which at first looks so like dried mud or peat, is solid asphalt, and the strange lake is the source of most of the good roads of our country. For years the material has been dug from this queer spot, and yet there is no sign of a decrease in the supply, and while some two hundred thousand tons are shipped away every year, yet more keeps ever rising from its unseen subterranean source to replace that taken out. From the "lake" the loaded cars are hauled up an inclined way to the huge sheds, and works at the hill's crest and here the asphalt is dumped into an endless chain of buckets, which move on an overhead cableway down the hill to the pier and waiting ships. Although at first sight it seems a slow process, yet by its means a thousand tons can be loaded on a steamer in a day, for while slow, it is steady and the whole system is so simple that it seldom gets out of order and only two or three men are required at the end of the pier to dump the buckets and start the empties back on their uphill journey. Here at Brighton there are also oil wells, for Trinidad is rich in petroleum, and near the further borders of the lake.

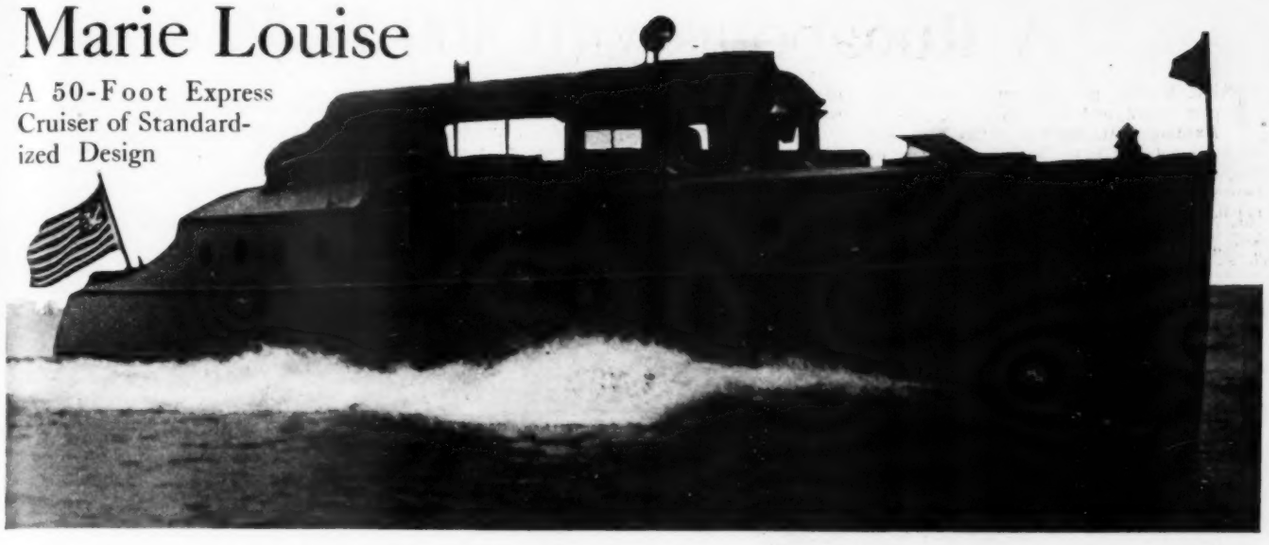


Loading asphalt at Brighton, Trinidad. The "rocks" in the foreground are solid asphalt

(*Continued on page* 58)

Marie Louise

A 50-Foot Express Cruiser of Standardized Design



AGAIN the boat of standardized design proves a success; this time it is the 50-footer Marie Louise, designed and built by the Great Lakes Boat Bldg. Corp., of Milwaukee, Wis., and owned by H. S. Fox, Jr., of Houston, Tex. This roomy express cruiser has accommodations for a party of eight and a crew of two.

The arrangement is worked out with quarters forward for a crew of two, entered by a hatch on deck, followed by a large and well-equipped galley. The main cabin extends from the galley to the bridge-deck and has some novel features. It is provided with book shelves, linen lockers, clothes lockers, small cabinets and a built-in Victrola. The transom seats provide sleeping accommodations for four people.

The power plant, an eight-cylinder Van Blerck that drives Marie Louise 23 m.p.h., is located under the bridge deck with all controls brought within easy reach of the steering-gear. Although the motor is under the deck, where it is completely protected, it is readily accessible through removable hatches.

Aft of the bridge deck is a large cabin containing the owner's stateroom, a large wardrobe and a lavatory. The stateroom has large linen lockers, a dresser, two shelves along both sides and extension transoms that form large double berths. There is a companionway at the after end opening into a small cockpit at the stern.

Although fast, Marie Louise is a real boat. The hull is of V-bottom type, has ample reserve buoyancy to ride easily in a seaway and rise easily on a head sea. The topsides forward have a good flare to throw any spray out and away from the deck and finishes off at the transom with a slight tumble home. The lines of the underbody are carefully worked out so that there is but a very small bow wave and hardly any disturbance in the wake of the boat.

The construction throughout is of the most substantial character, and no details have been skimped to save weight at the expense of strength. The hull is of seam-batten construction throughout, with heavy, well-braced station frames and lighter intermediate frames.

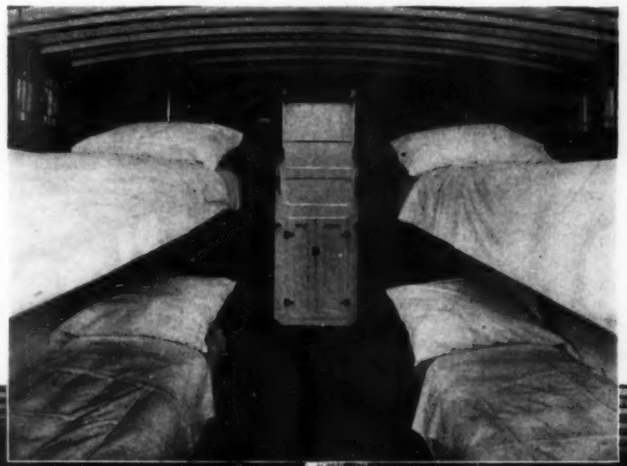
The comfort of the guests while on deck has been given the same careful attention as in the cabin accommodations. The bridge deck, where they will spend most of the time when under way, is protected against the elements by a removable sash windshield set just forward of the bulkhead. A water-proof pipe frame awning with side curtains extends from the windshield well back over the after cabin. The rails at the sides of the bridge deck are provided with spray cloths, a feature that will be appreciated by those aboard when running through a beam sea with a strong wind.

A good-sized dinghy is carried in chocks on the after cabin roof and two stockless anchors on the raised deck forward ready for use.

Marie Louise is electrically lighted throughout, including the sailing lights and a searchlight mounted on top the forward end of the canopy with the controls directly over the steering wheel, where they are in convenient reach of the navigator.

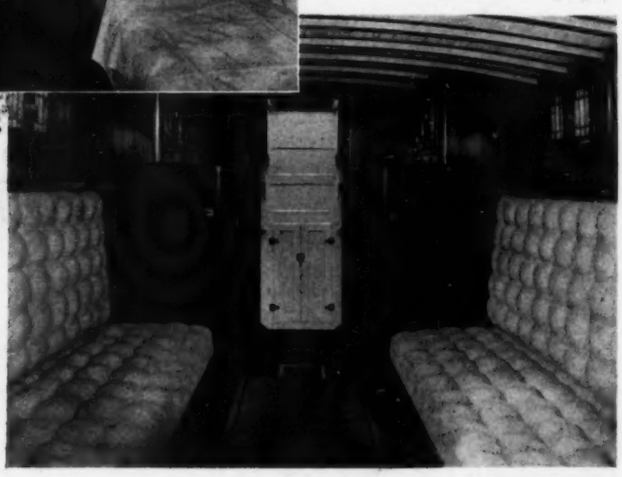
All the bright work both inside and out is of selected mahogany, stained with the new color that has proven so popular of late. It is between the dark rich mahogany finish, as it is generally known, and a light brown walnut stain. The cabins are finished in white enamel with mahogany trim, while the galley is white throughout, making a very pleasing and bright interior.

Every bit of available space has been utilized for some useful purpose or storage space.



Main cabin with berths made up. Real, comfortable sleeping accommodations for four people

The owner's stateroom looking forward. The clothes locker and lavatory are on opposite sides of passage leading to the deck



Looking forward through main cabin to galley showing the ample closet space provided and shelves for books and personal effects

A Runabout with 400 H. P.

THE highest powered runabout of the past season, and the fastest one, is G. F. Harding's Mouser III. This boat was designed and built by the Ramaley Boat Co., of Wayzata, Minn., and is driven by a 400 h.p. twin-six Van Blerck motor at a speed of 46 m.p.h.

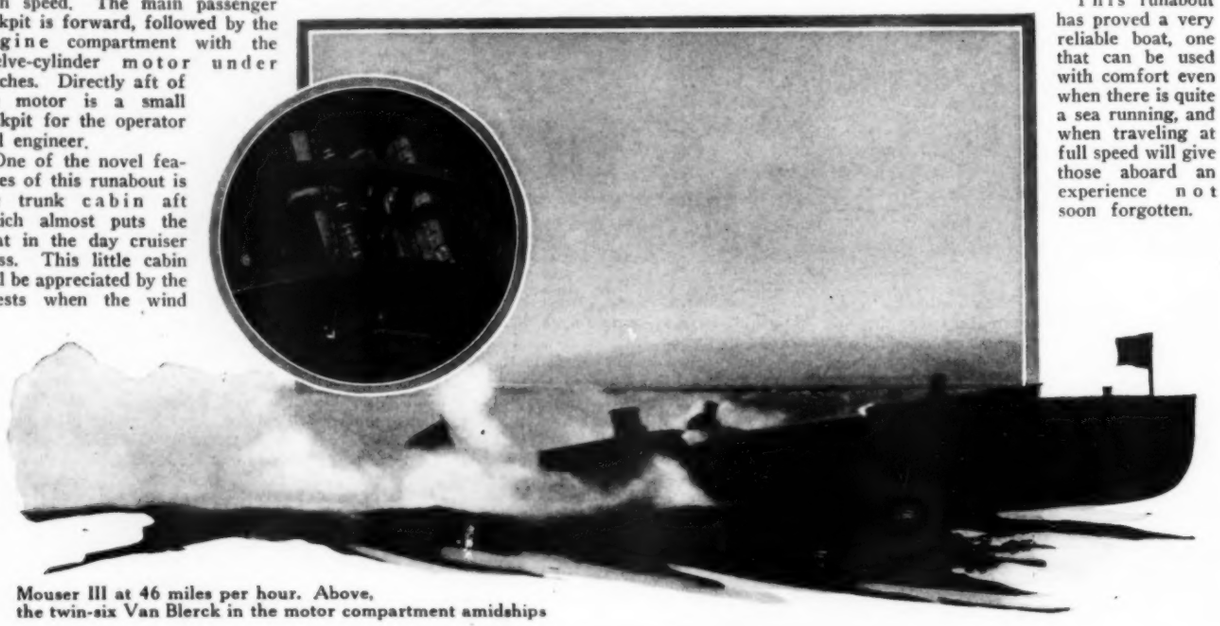
This 40-foot runabout has a beam of 9 feet, making a remarkably roomy boat for one of such speed. The main passenger cockpit is forward, followed by the engine compartment with the twelve-cylinder motor under hatches. Directly aft of the motor is a small cockpit for the operator and engineer.

One of the novel features of this runabout is the trunk cabin aft which almost puts the boat in the day cruiser class. This little cabin will be appreciated by the guests when the wind gets busy, and rolls up those nice little choppy waves.

This coming season Mr. Harding plans on trying for a long distance speed record, Chicago to Mackinac at 40 m.p.h. To maintain that speed the motor will be required to turn up about 1,250 r.p.m.; this is well within the engine speed already developed when the boat was making its record as a 46-miler.

In building Mouser III weight and strength were not sacrificed for speed. The hull is of the most thorough and substantial construction throughout and is well braced transversely by the bulkheads that separate the different compartments and at the engine compartment by the heavy deck beam over the center of the motor, as shown in the illustration.

This runabout has proved a very reliable boat, one that can be used with comfort even when there is quite a sea running, and when traveling at full speed will give those aboard an experience not soon forgotten.



Mouser III at 46 miles per hour. Above, the twin-six Van Blerck in the motor compartment amidships

Two Chinese-Built Boats

THAT motor boats are coming into general use even in the out-of-the-way corners of the earth is more evident every day, and wherever motor boats are used the American-built marine engine is in evidence. These two boats were built by the United Engineers, Ltd., of Singapore, using Chinese workmen under European supervision.

Pundut is 27 feet in length, 6 feet beam and 2 feet 9 inches draft and is powered with a 24-27 h.p. Scripps motor with kerosene attachment, which gives a speed of 11 m.p.h. This boat is used for passengers and freight. The after section of the awning can be tilted to facilitate handling freight. The hull is of the usual frame type construction.

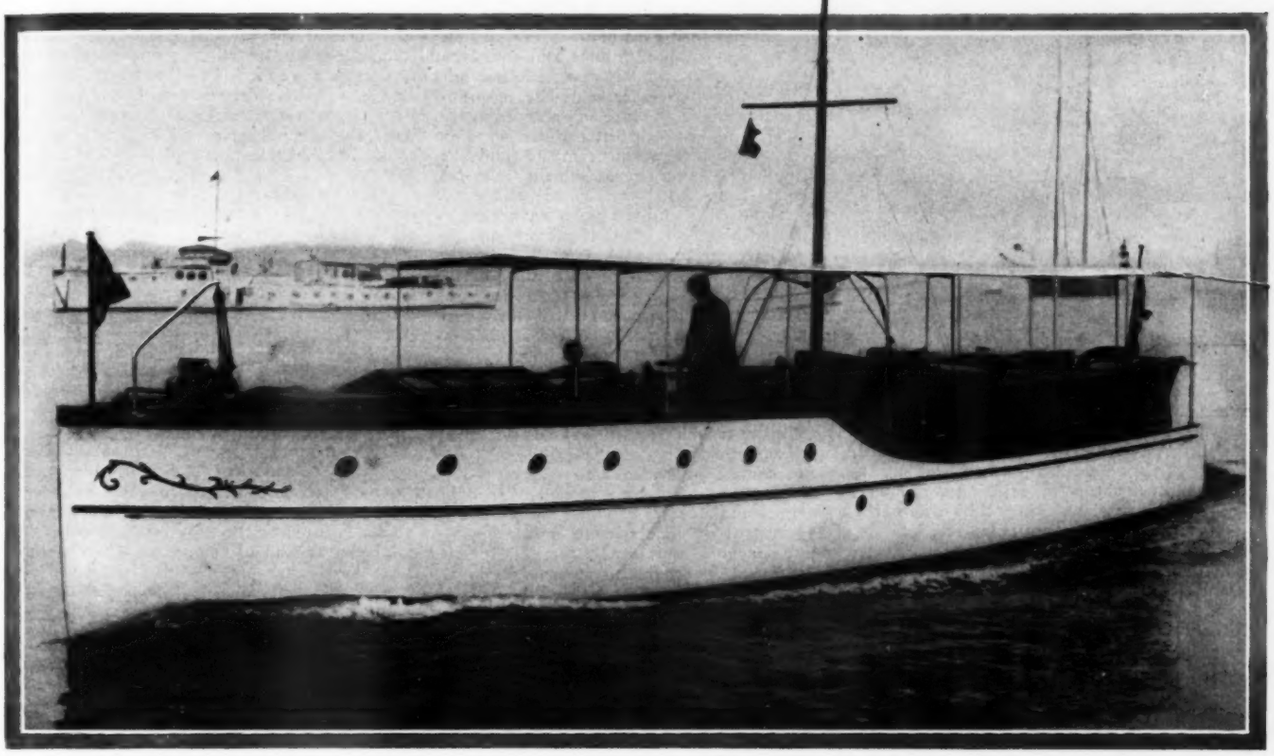
Scud, a 28-foot runabout with a 5-foot beam and 2 feet 7 inches draft, was built by the same company, and is also powered with a Scripps motor. The hull is seam batten construction with heavy station frames and light intermediate frames. The windshield is of heavy, substantial construction and varies somewhat from the practice in this country.

The United Engineers, Ltd., are the only European ship-building concern in Singapore. They have built many motor boats for the British and Dutch governments and rubber companies for use on the Malay Peninsula.

Pundut is built to carry either passengers or freight in the after cockpit. The awning is in two parts so that it can be removed for loading freight from a wharf. The interior of Scud shows the seam batten construction and a remarkable accessible motor installation. Both of these boats are powered with Scripps motors

Loleta, a Fast 57-Footer

An Attractive Western Craft Which Combines Superior Speed with Comfortable Below-Deck Accommodations—An Eight-Cylinder Van Blerck Motor Is Installed Beneath the Bridge

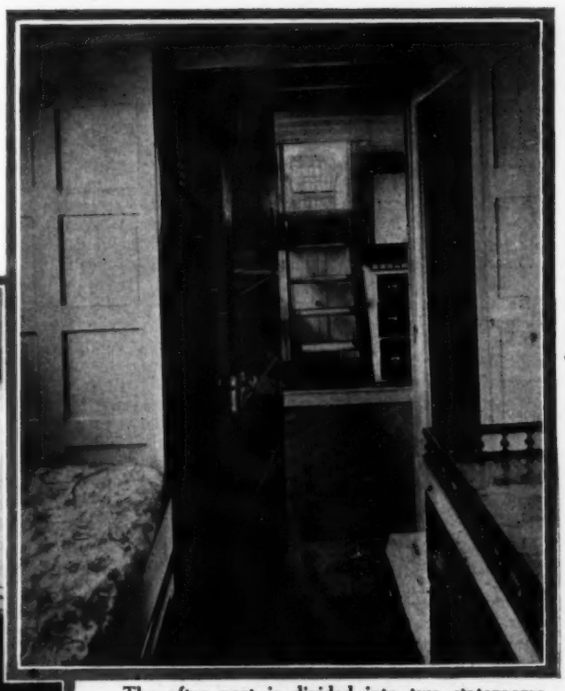


Loleta is an attractive cruiser of Watts design, owned by Albert H. Schmidt, of Detroit, Mich.

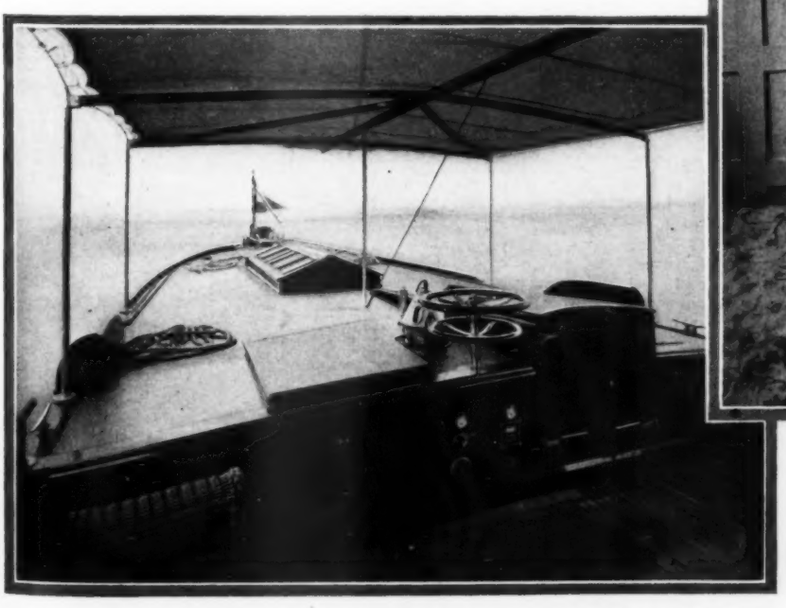
LOLETA, designed by J. Murray Watts, of Philadelphia, Pa., was built by the Smith & Williams Co. for Albert H. Schmidt, of Detroit, Mich., and is a worthy exponent of the express-cruiser idea, while showing in her outboard appearance no evidence that quarters have been cramped for the sake of attaining speed. She is 57 feet 9 inches in overall length, and 9 inches shorter on the waterline, while her beam and greatest draft are 11 feet and a half and 3 feet, respectively.

Installed beneath her bridge deck is a 135 h.p. Van Blerck engine, controlled at the wheel, with switch and dials mounted on the bulkhead. Forward of the bridge is the dining saloon, with two extension transoms, preceded by a full-width galley. The crew's quarters are in the forecastle. The owner's stateroom and a guest's room are aft, provided with a large bathroom which directly connects with each stateroom.

In addition to the Van Blerck engine which forms the main power plant for Loleta, the engine-room is equipped with an auxiliary set for furnishing current with which to light the boat and start the motor, and for pumping purposes.



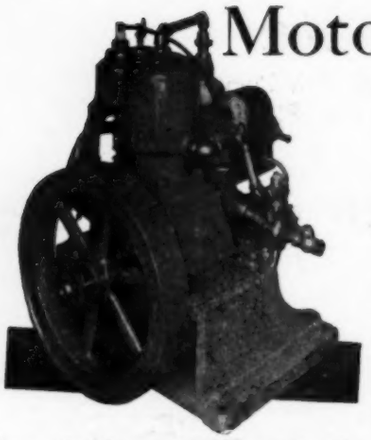
The after part is divided into two staterooms with a connecting bathroom



Loleta is finished in the finest selected Honduras mahogany, and no expense was spared in her construction

Motor Boats and Motors of 1918

The Trend of Engine and Boat Design as Indicated by the Exhibits at the National Motor Boat Show



The smallest four-cycle motor at the Show. The little 2 h. p. Regal that embodies in its design most of the refinements found only in the larger motors

THE most notable feature of the recent Motor Boat Show—and the one of most importance to the man about to purchase a boat—was that practically every boat in the show, irrespective of size and type, was a stock model, or, as it is now called, a standardized design. This means that the man who buys a new boat does not get an experiment in either design or power plant. He will have an outfit of proven merit. If speed is his principal object he knows what other boats of the same design and power have accomplished, and if he wants comfort and reliability he is sure that his requirements will be fully complied with.

We do not mean that the day of the boat designed to meet the owner's special requirements is past. There are many men who know what particular type of boat will best serve the purposes for which they will use it, but for the average motor boatman the boat of standard design will save much worry, many disappointments and considerable expense.

In the smaller sizes, the dory model will undoubtedly be very popular. This type has proved its seaworthiness and general superiority during many years of the hardest service. Beginning with the fisherman's dory, propelled by an "ash breeze," these boats have been successively adapted to sails and motors with equal success. This year the principal improvement is to be found in the power plant. When motors were first used in these boats they were invariably of the single-cylinder make-and-break two-cycle variety. We now have dories driven by four-cylinder four-cycle motors of small size that are as smooth running, flexible and reliable as the motors in the larger boats.

In the runabout class there has been little change in the hull design or arrangement. The Albany Boat Corporation is building a number of standardized runabouts that vary from the general practice in that the motor is located aft of the cockpit instead of forward of it. The Elco Company have a novel windshield of a type used on certain automobiles. It consists of a tubular frame, forming two panels, attached to the bulkhead and tilted slightly backward. The center upright is a little ahead of the sides, giving a V-effect. When conditions warrant it, there are two pieces of celluloid with grommets around the edges that snap over hooks on the frame.

Many of the reverse gears in runabouts are operated by separate pedals, one for ahead and one for reverse, instead of the usual reverse gear lever. This change will please the man who drives both a car and a boat. No runabout is complete without an electric starter, and quite a number of the boats are equipped with either a tachometer or a boatmeter that indicates the speed in miles per hour.

The 1918 cruiser will not vary much from those of last season except that some of the motors are a little more powerful and practically all are equipped with electric starting and lighting units. The new express cruisers are nearly all of the military type and show very little change from last year's practice, except that possibly the twin-screw power plant is more popular than ever before.

In the way of boat fittings and equipment there is very little that is new. Electric sailing lights for the smaller boats have been improved some in appearance and reduced in size and designed to provide better protection to the electrical equipment against rain and spray.

The marine motors at the show indicate few changes from last year's models. Electric starters are part of the regular equipment of nearly all but the heavy-duty motors, and the latter have air starters. In ignition practice the vibrator coil seems to be a thing of the past. Practically every motor at the show was equipped with a high-tension distributor system employing a non-vibrating coil or a high-tension magneto. Most of them had both systems as regular equipment.

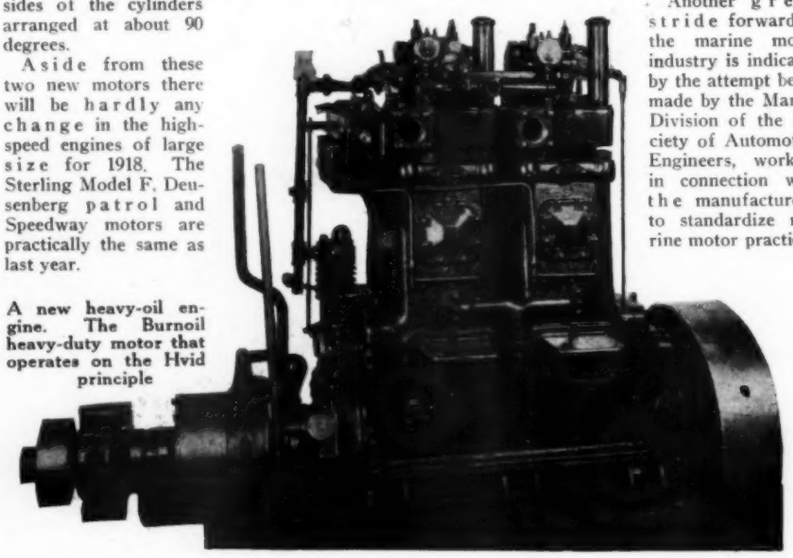
The elimination of the vibrator coil from marine practice will save the motor boatman many troubles and delays and hours of work adjusting coils and repairing burned and pitted contact points.

Kerosene adapters have been developed by several manufacturers for their motors and if the price of gasoline remains at the present figure, or goes any higher, there will be a big demand for engines that can be run on either fuel. As yet Diesel type motors have been built only in large units, but the Burnoil Engine Company has produced a heavy-duty motor, built under the Hvid patents, that will burn kerosene, distillate, fuel oil and crude oil equally well. This type of motor does not depend upon an electric spark, hot bulb or high compression for ignition. There appears to be no change in the design of heavy-duty gasoline motors for the coming year.

In the high-speed, high-powered motor field the Van Blerck Motor Company has just placed on the market their new Model M motor in four, six and eight cylinders. These are equipped with Leece-Neville two-unit starting and generating set, Schebler carburetor, Delco battery system and Berling twin-spark magneto.

The Murray & Tregurtha Company has put on the market a six-cylinder motor specially designed for sea sleds and express cruisers. This new engine is of the valve-in-head type, with two inlet and two exhaust valves for each cylinder operated by an overhead camshaft. It is equipped with a Stewart carbureter and two twin-spark six-cylinder model magnetos, which give four simultaneous sparks in the cylinders. The spark plugs are located in the sides of the cylinders arranged at about 90 degrees.

Aside from these two new motors there will be hardly any change in the high-speed engines of large size for 1918. The Sterling Model F, Deusenberg patrol and Speedway motors are practically the same as last year.



A new heavy-oil engine. The Burnoil heavy-duty motor that operates on the Hvid principle

A new motor, one in a class by itself, is the little 2 h.p. four-cycle Regal. Although about the smallest four-cycle motor on the market this little engine has all the refinements and improvements to be found on the larger machines. It has a positive driven force-feed oiling system, high-tension magneto, counterbalanced crankshaft, air heater and muffler, enclosed gears and large handhole plate on the crankcase.

There will be little change in high-tension magnetos on the 1918 motors. About the only variation from last year is to be found in the Berling; these have had the distributor changed so that the wires to the spark plugs are lead from the face instead of the top, reducing the height somewhat. The new model has die-cast frames, making them practically water-tight, and the machine is so designed that every part is easily accessible. The magnets are held in place by a strap, doing away with screw holes in the magnets, and the liability of cracks at this point in the hardening process.

There are also several new spark plugs specially designed for high-speed high-compression motors. They employ mica instead of porcelain, are provided with radiation flanges or surfaces to reduce the temperature, and have a minimum amount of metal exposed to the intense heat of combustion, so as to reduce the chances of overheating and the resultant preignition. In general, the newer spark plugs show a tendency toward huskier construction, heavier porcelain, shorter exposed electrodes and better design to eliminate carbon troubles.

There will probably be used on some of the motors during the coming season a new type of ignition apparatus. This combines a direct current generator and a non-vibrating coil ignition system. The generator has sufficient capacity for charging storage batteries, and incorporated in the same machine is the usual breaker and distributor, making a compact system. This type of ignition is being put on the market by the Dayton Engineering Laboratories Company and the North East Electric Company. The latter company is also developing a non-vibrating coil system with the coil mounted in the base of the distributor.

About the only improvement in carbureters is a new Schebler (L-2) having two auxiliary air inlets with gasoline dash pots on the air valve stems. This carbureter was designed for gasoline fire engines, but is successfully used on large high-speed marine engines. One of the Fay & Bowen motors at the show was equipped with this carbureter.

Another great stride forward in the marine motor industry is indicated by the attempt being made by the Marine Division of the Society of Automotive Engineers, working in connection with the manufacturers, to standardize marine motor practices.

Is Your Motor Ready?

If It Is, Very Little Attention Will Be Required to Keep It in Good Working Order All Summer

By T. W. Rockwell

When working on a motor, use the proper tools. Stillson wrenches are intended for pipe work, not nuts and bolts; and don't use your biggest wrenches on the smaller bolts—they strip or break

Be sure the grooves as well as the piston rings are clean. Carbon and oil behind the rings will bake hard and hold them away from the cylinder wall

AS a rule, the man who owns a motor boat must be his own engineer, machinist and mechanic. He cannot run his boat into a shop for a thorough inspection by an expert and overhauling by specially trained machinists as the motorist does his car. To be sure, there are marine repair shops, but they are patronized chiefly by the owners of the bigger craft.

The owner of the smaller boat can always secure the services of the so-called "gas engine expert"—the man who makes his appearance every spring wherever a number of boats are to be found—but it is more satisfactory to the owner and better for the motor if the "expert" is kept a mile away. If the marine engine is in really bad condition there are two satisfactory methods of having the work done: Send it to the factory in the fall or have a man sent from the factory to do the work. The former method is generally the cheapest in the end.

When it is only a question of putting the motor in commission there is no reason why the motor boatman cannot do it himself. To begin with, the motor should be taken down. Now, some men argue that if the engine ran all right in the fall it will be all right in the spring. Will it? There are many things that may be wrong inside, not serious enough to do damage now, but that will cause no end of trouble during the coming season—and such things always go wrong just when you have a party waiting to go for a trip. A piston ring may be broken, the space behind the rings may be full of carbon and oil, so that they will stick fast after a short time and refuse to do their work; there may be loose nuts or bolts, grit or obstructions in the oil channels and tubing, loose bearings not easily found by a superficial examination, gaskets about ready to give out, clogged-up water jackets, a slightly scored bearing and any one of a host of other derangements bound to cause serious trouble if not attended to.

One of the greatest difficulties in getting people interested in motor boating is the apparently great amount of work required for a little pleasure. After waiting all afternoon for his friend to get his motor started one fine day last summer, a prospective motor boat owner remarked: "What fun is there in a sport where you spend all your spare time in the spring putting the boat in commission, all your time in the summer tinkering with a dirty, balky motor, and all fall getting the boat ready for the winter?" We agree with him that there is no fun—and no excuse for the trouble, either.. *Put your motor in good condition in the spring and very little attention will be required to keep it in good working order all summer.*

In taking a motor down, mark the parts so they will go back in the same place and in the same position. They may be interchangeable in a new motor, but after being in service for a season or two each will have worn just a little and will be a perfect fit only when put back in the same place. This is particularly true of crankpin bearings and keys. Two keys may appear exactly the same, but they cannot be interchanged. A poorly fitted key will invariably wear the key-way and cause trouble.

Another important thing in engine work is to use the proper tools. Don't use a 16-inch wrench on a 5/16-inch cap screw—it will break off; and don't use a Stillson wrench on nuts or bolts. If they stick hammer them lightly, use a little kerosene and patience and they will loosen up. This applies especially to stud bolts in cylinder heads and exhaust manifolds.

When you start taking your motor down get several small boxes to keep the parts in, so they won't get lost. First, take off all the electrical equipment and wires, spark plugs, priming cups, relief cocks, air pumps and piping, carbureter and other small pieces of equipment. Take down the waterpipe and pump and make sure that they are free from scale and sediment. Remove the manifolds and clean them out. See that the water connections through the hull are clear and not corroded and ready to break off.

Before taking off the cylinders try all the bearings by lifting with a pry to see if there is any play. Note which ones are loose and need special attention. When you have the cylinders off scrape out the carbon and examine the walls for fine scores; they may be caused by a sharp point on a piston ring or grit. Run a wire into the water jackets through the connections and see if there is a deposit of mud and scale to be washed out; there generally is.

When you are satisfied that the cylinders are clean take the connecting rods off the crankpins. If the wrist pins are tight leave them alone, but if they are loose about the only satisfactory repair is new bushings.

Remove the rings from the pistons (being sure to mark them so they will go back into the same grooves) and clean all the oil and carbon from the grooves and the sides and back of the rings. This is one place where nearly every motor is sure to collect some carbon, and the heat will soon bake it into a hard cake that will hold the rings into the grooves and cause loss of compression and power.

While the rings are off try each one separately in the cylinder and see whether they have worn enough to be open at the joint. There should be a space of about 1/64-inch for expansion, but a wider space will allow the gas to leak past on the compression and combustion strokes. This applies especially to rings that have a plain, diagonal joint. Lapped joint rings are generally more satisfactory and wear longer than the diagonal joint type. In putting in new rings the ends at the joints should be given one stroke with a file to take off the sharp edge, as it is liable to cut a small groove in the cylinder wall.

After the crankshaft has been removed the base should be washed out with kerosene and all sediment carefully removed. The muck always found in the bottom often contains a little sand that had adhered to the castings. small particles of metal and pieces of hard carbon; any of these will cause trouble if they work into a bearing along with the oil. When washing out the base the best thing to use is an old sponge, but if one is not handy, cheesecloth makes a fair substitute. Don't use waste: the lint and thread will stick fast and gradually work into the oiling system, where they invariably collect and stop the flow of oil.

It is best to clean all the parts thoroughly as you take them out, and wipe them off before putting them back, so that there will be no chance of getting dirt or grit into the working parts. The brass fittings can be made to look like new by putting them in a hot solution of lye to remove the grease and dirt, and then dipping them in nitric acid. If the grease does not come off easily in the lye solution a small wire brush will do the trick.

If the motor needs a new coat of enamel it should be applied while it is dissembled. A permanent finish, and one better than many motors have when they are new, can be had

with little trouble. The first thing to do is to remove all the old paint, using a scraper, a torch if necessary, and a stiff wire brush, so there is a clean surface on which to start the new finish.

For the first coat use a lead and oil paint of the color desired. After it has dried hard go over it with fine sandpaper until the metal shows through, leaving the paint as a filler in the minute depressions. Follow this up with three coats of engine enamel (other enamels will not stand the heat). After each of the first two coats have dried hard rub them down perfectly smooth with No. O sandpaper. This will give an absolutely smooth surface for the last coat and assure a smooth, gloosy finish and one that will last for several years. Some of the high spots of the metal should show after sandpapering the first coat of enamel.

Before starting to assemble the motor scrape out all the oil grooves in the bearings with a scraper or other sharp tool, as the babbitt gradually creeps over into the grooves. Clean out all the oil holes, and if the crankshaft is drilled for oil passages wash them out with kerosene or gasoline. This can be done very easily by putting a short piece of rubber tubing over the end of an oil gun and holding it tight up against the end of the hole while forcing the liquid through the oil channel.

On the four-cycle motors the valves generally require at least a little grinding with a fine compound after each season's use. Sometimes they are worn so badly they need truing up in a lathe, but in that case either the spring is too strong, the metal in the valve is too soft or the valve has been used for a number of years and has become worn. In a few cases the valve seat has to be recut, but that is rarely necessary. Assuming that the contact surface on the valve is not badly pitted or grooved, the valve can be made to close perfectly tight by grinding with emery or carborundum, not too coarse, until the valve and seat appear bright all around, and then finishing with either one of the valve-grinding compounds or a paste made of emery flour and grease.

When grinding valves the best results are obtained by applying just enough pressure to the valve to keep it in contact with the seat, and having the grinding compound spread in an even, thin layer over the surface. Too much pressure will cause scores on the surface, and is liable to force some of the grains of the abrasive into the metal. These grains will either stay in the metal and cut whatever comes in contact with them, or if they work out, they are apt to find their way into the cylinder.

After finishing the grinding process the valves and seats, valve guides and other surrounding parts should be thoroughly washed with gasoline to remove any of the grinding compounds that may have adhered to the surfaces.

When assembling the motor the bearings should be set up just a little stiff. After each bearing has been adjusted put a piece of brass rod or hardwood block against the iron or steel cap—never against the bronze or babbitt—and give it two or three sharp blows with a hammer. This will flatten out any high spots that may have resulted from scraping out the oil grooves or other causes, and if such is the case the bearing can be tightened up a little more. Sometimes the excessive wear that appears to take place in a motor during its first few days' use is nothing more than the wear on the high spots, or die-cast babbitt bearings not being properly seated.

In putting the pistons back into the cylinders be sure that the joints in the piston rings are spaced at equal intervals around the piston. This avoids excessive wear on one portion of the cylinder wall. Above all, be sure that the wrist pin is securely fastened, as a loose pin will score a cylinder more quickly and deeply than anything else.

The bolts in the crankpin end of the connecting rod should have cotter pins above the nuts to prevent them working loose and going adrift in the crankcase. The most satisfactory arrangement for this is to use castellated nuts for these bolts, as they cannot loosen up at all when a cotter pin is used. Set screws holding the wrist pin in place can be held securely by drilling a small hole through the head and using a piece of steel wire to hold them from turning. Many a crankcase has been broken by the connecting-rod bolts working loose from vibration and letting the cap fall off, all from the lack of a little cotter pin.

In two-cycle motors the question of gaskets is a very important one. Practically all manufacturers use heavy manilla paper for the base gasket, and in replacing this, use the same thickness paper as the original gasket. The easiest way to cut a paper gasket is to lay the sheet over the part to be fitted and cut the gasket by tapping it along the edges of the metal with a peen hammer. Start with the bolt holes and drop the bolts in to hold the gasket in position, then cut the inside and lastly the outside.

Just before putting the gaskets in place wet them thoroughly. By so doing the paper will swell and be spongy, so that when the two parts are bolted together the paper will fill any tool marks or low places in the metal. Some people prefer to use shellac on paper gaskets, but just as good results are obtained by wetting the paper and it is easier to separate the parts next time.

Fine, powdered graphite dusted over one side of a paper gasket will effectively prevent it from adhering to the metal. Cylinder head or other gaskets subjected to intense heat sometimes last longer when cut from woven asbestos with brass wire insert.

On some motors using oval flange connections copper-asbestos gaskets can be used with good results for the manifold and waterpipe connections. These will last for several years and resist heat and the corrosive action of salt water successfully.

After the cylinders are in position on the base, turn down only very lightly on the holding-down cap screws or stud bolts until they are all in place. If it should be a motor with the cylinders cast separately, put the inlet and exhaust manifolds on before tightening up the base bolts. This will assure that the finished surfaces on each cylinder will line up parallel with the finished surface on the manifold and make a tight joint; then tighten the holding-down bolts, and lastly the manifold bolts.

Every motor, whether two- or four-cycle, should have a paper (or other material, if necessary) gasket between all the metal surfaces. This will equalize unevenness in the surfaces and avoid cracked castings when the bolts are tightened up.

If the motor has a mechanical lubricator, wash it out with kerosene and gasoline, and see that all the check-valves are working properly. All the oil tubing should be cleaned by running a wire through it and drawing a piece of cloth, saturated with gasoline, through on the end of the wire. If there are oil rings on the cranks see that the end of the oil pipes will discharge the oil into the rings,

(*Continued on page* 58)

After the motor has been assembled go over it and see that the parts are all properly adjusted and that everything is tight. A thorough inspection occasionally during the summer will often save many hours' work later on

The reverse gear should be given as much attention as the motor. Remember that it is the connecting link between the power and the propeller

Enamel applied to a dirty surface is wasted—it will not stick. Always start the new finish on the clean metal

PRIZE CONTEST IN QUESTIONS & ANSWERS

Flexible Couplings Reduce Friction

Some of the Reasons Why a Rigid Coupling on the Shaft Is Not Always Desirable

THE PRIZE CONTEST—Answers to the First Question in the January Issue

Flexible Couplings Should Not Be Confused with Universal Joints

(The Prize-Winning Answer)

I HAVE heard many questions asked regarding flexible couplings. Many motor boat owners seem to know little about them and the advantages gained by their use. First I want to make a clear distinction, for those who are confused, between flexible couplings and universal joints. A flexible coupling is used to take the place of a regular rigid coupling. It is flexible to the extent that it will take care of a misalignment of several degrees. It is not intended to transmit power through a large angle. It requires no additional thrust bearings. A universal joint, on the other hand, is intended for installations where there is a considerable angle between the engine crank and propeller shaft. A universal joint should always have an extra thrust bearing in order to take the strain off the joint.

Let us consider a few typical cases bearing on the subject at hand. Take the case of a new boat, where the engine and shaft are lined up before the boat goes into the water. There is apt to be an unavoidable deflection in the shaft line, due to the way the boat is supported ashore and the way it rests in the water. Again, it may be caused when the dried timbers swell. After the boat is in the water little attention is paid to the shaft alignment. The boat is hauled out for the winter. The next spring, in going over the engine bearings and stuffing box, the owner may be surprised to find the shaft is worn or scored where it goes through the stuffing box or stern bearing. Possibly he was troubled with a hot bearing or a leaky stuffing box during the past season. It is evident that the shaft line is at fault. What is to be done to remedy this trouble? First, he may realign the shaft or put shims under the engine. Perhaps either or both is more easily said than done; second, he can install a flexible coupling. The probability is that the shaft is only slightly out of true line, but this makes all the difference between an installation mechanically defective and one that is perfect. The flexible coupling will remedy this trouble and is the logical answer.

A boat is not absolutely rigid, especially when in a heavy sea. It tends to hog and sag as it goes through the waves. This introduces more or less of a strain in the shaft line. This may or may not cause trouble, as a leaky stuffing box or the loosening of the shaft on the couplings. If a flexible coupling is installed it takes care of these strains.

Another very common trouble is the excessive vibration due to a shaft that is out of line. This vibration is bad for the power plant, the boat and the crew. One of the simplest remedies is a flexible coupling.

How and where shall a flexible coupling be installed? If possible it should take the place of the rigid coupling between the engine or the reverse gear and the propeller shaft. It should be placed as near the engine as possible. If so installed it needs no additional bearings. A well designed coupling requires no attention aside from the necessary lubrication, and absorbs practically no power. The installation is simple and can usually be done without even hauling the boat out of water. In choosing a flexible coupling careful attention should be paid to size. It should be large enough to handle the power at the maximum speed.

The advantages in the use of a flexible coupling may be stated as follows: Freedom from strains due to misalignment of the propeller shaft; loss of power in hot and worn bearings; inconvenience from leaky stuffing box; less vibration; simplicity of installation; little or no additional care; a smooth running plant in all weather.

In all my experience the only disadvantage is cost. When one considers that the "price of rigidity is apt to be trouble," the initial cost of a good flexible coupling is a very material asset to the power plant. It both remedies and prevents most troubles due to the shaft line.

In conclusion, I think the advantages of a flexible covering in the shaft line make it a very serviceable investment. It means less trouble, better transmission and a more efficient power plant.

J. B.,
Oak Park, Ill.

* * *

Flexible Couplings Have Many Advantages and Few Disadvantages

FLEXIBLE couplings have a number of advantages that are well worth consideration in connection with almost any motor boat, as they remove several conditions that cause a loss of motor power, wear and waste of fuel. Their disadvantages are few and hardly worth notice.

Every motor, of course, has to have some sort of coupling to connect it to the propeller shaft, and for a long time the ordinary rigid flange coupling was used exclusively. It was found in many boats that there was oftentimes a loss of power in the motor and a binding of the shaft. This was traced to the misalignment of the propeller and motor shafts, due to the fact that every boat, no matter how rigidly built, will twist and weave more or less when running in a seaway. This twisting causes the motor shaft and the propeller shaft to be thrown slightly out of alignment with each other, and the result is that strains are set up, causing unusual wear of the bearings and a loss of power on account of the excessive friction.

To line up the propeller shaft true and parallel with the motor shaft, so that when they are bolted together with a flange coupling there will be no strain or binding, requires much care and skill. Even when perfect alignment is obtained there is no certainty that this condition will remain when the boat is running in a seaway, as already explained. But to overcome these difficulties the flexible coupling was devised and by its use much trouble, both in making the installation and afterwards, is avoided.

With a rigid coupling, every time the boat twists even slightly the shaft is thrown out of its original alignment, causing excessive friction: whereas, if a flexible coupling is used any slight variation in the shaft alignment both

Questions for the May Issue

1. Will the experience gained from the use of motor boats in the present war be likely to materially modify motor boat design and construction in the future? If so, along what lines will the changes probably be made?
Suggested by H. A. H., Baltimore, Md.

2. Discuss the subject of stuck valves, explaining what causes the difficulty and how to prevent it.
Suggested by F. T. L., New York City.

3. Tell and illustrate how to make, fit and fasten metal angles that will eliminate chafing at the stern ends of a boat's planking.
Suggested by G. S. H., Boston, Mass.

Rules for the Contest

Answers to the questions, addressed to the Editor of MoToR BoatinG, 119 West 40th St., New York, must be (*a*) in our hands on or before **March 20**, (*b*) about 500 words long, (*c*) written on one side of the paper only, (*d*) accompanied by the senders' names and addresses. (The name will be withheld and initials or a pseudonym used if this is desired.) Questions for the next contest should reach us on or before the **20th of March.** The Editor reserves the right to make such changes and corrections in the accepted answers as he may deem necessary.

The prizes are. For each of the best *answers* to the questions above, *any article or articles* sold by an advertiser advertising in the *current* issue of MoToR BoatinG of which the list price does not exceed $25, or a credit of $25 *on an article* which sells for more than that amount. (*There are three prizes—one for each question—and a contestant need send in an answer to but one if he does not care to answer all three.*)

For answers which we print that do not win a prize we pay space rates.

For each of the questions selected for use in the next contest, *any article or articles* sold by an advertiser advertising in *this issue* of MoToR BoatinG, of which the list price does not exceed $5, or a credit of $5 *on an article* which sells for more than that amount.

All details connected with the ordering of the prizes selected by the winners must be handled by us.

when the motor is being installed and afterward, when the boat is in commission, is automatically taken care of by this flexible link. This overcomes wear in the bearings and the consequent tendency of the stuffing box to leak. When a shaft binds it takes more power from the motor to overcome this extra friction, and this increased power means the use of more fuel, which is, of course, wasted.

The only disadvantages of flexible couplings are that they require lubrication, and with some of them it is necessary to use a thrust bearing on the propeller shaft aft of the coupling. However, these are very slight objections when compared to the numerous advantages to be gained, for they are easily lubricated by packing with soft grease in a leather boot, and a thrust bearing is merely a slight additional expense when installing.

Briefly, the benefits to be derived in using a flexible coupling are these: Any slight misalignment of the shafts is compensated for, friction, with the accompanying heating and wear is eliminated, stuffing boxes are less liable to leak and fuel otherwise wasted in overcoming excessive friction is saved. On the whole, the odds are very much in favor of using a flexible coupling.

A. L. M.,
Brooklyn, N. Y.

* * *

Nothing Better When Properly Installed

EVERYONE cannot properly align an engine and shaft. Even the mechanics employed by some of the boat yards are apt to pass a job as good enough rather than take the time to do the nice part of the job and get it right.

The alignment is the most particular part of any installation. Misalignment, especially with a rigid coupling, will cause the shaft to bind in its bearing, causing them to heat and wear rapidly, and also a loss of power. Leaky stuffing boxes and broken shafts in many cases are the direct result of misalignment. Elimination of the misalignment friction will cure most of your troubles.

A flexible coupling between the motor and propeller shaft will eliminate the excessive friction from misalignment, whether it is the result of a poor job of installing or the distortion of a hull under power. A flexible coupling is not a universal joint and is not intended to take the place of one. A universal joint transmits motion between two shafts which are out of line or at an angle, and must be provided with suitable thrust bearings. A flexible coupling should be aligned just as religiously as a rigid coupling, and the better grades are designed to operate without extra thrust bearing.

Installed in this manner the flexible coupling is called upon to compensate for only the slight difference in alignment due to the changes in hull form when in heavy weather and when under power. Generally the lighter the construction the greater are the hull changes, and the advantages of the flexible coupling. It is intended that under normal operating conditions the flexible coupling will do no work other than transmit the turning motion of the shaft the same as a rigid coupling.

Improper use and installation has caused the failure of most flexible couplings (of the proper size for the speed and power transmitted) that have failed. Failures of the above nature have been the cause of the coupling being condemned when it was not at fault.

The mechanical disadvantages of a good flexible coupling are negligible, while the advantages, especially in an amateur installation, are many. A few drops of oil occasionally is all the attention required, and some types will operate satisfactorily without lubrication.

The cost is more than double that of an ordinary coupling, but you must pay well for all good things. Is it cheaper to replace bearings, stuffing boxes and even the shaft, worn out or broken from misalignment, or to pay the price of a good flexible coupling and save the trouble and expense of breakdowns?

A cheap article is always cheap in material and workmanship, no matter how polished and finished it may look. Buying cheap machinery or parts is decidedly poor economy. Get the best and be assured of long life and efficient service.

W. B. M.,
Newburgh, N. Y.

Overcomes Difficulty in Lining Up Engines

IF the engine and propeller shaft are in perfect alignment, and can be kept so, then a flexible coupling is of no advantage and is only an unnecessary expense.

If they are out of line even slightly, and a solid coupling is used to connect them, then something must bend or spring at every revolution. This is usually the propeller shaft, it being smaller and more flexible than the clutch or engine shaft. This bending exerts an unnecessary side pressure or binding on the bearings and stuffing box, causing them to heat and wear out quickly. This extra friction is also the cause of more or less loss of power.

Any one that has had experience installing marine engines knows what a difficult job it is to line up the engine and shaft perfectly, and then after the greatest care has been taken there is no certainty that the boat will not change form after going into the water, throwing the shafting out of alignment again more or less. And again, when the engine is taken out of the boat for repairs there is usually some doubts as to whether it is exactly in line when replaced. As for going over the work and testing the engine and propeller shaft for alignment with the boat in the water, this is more of a job than the average boatman cares to undertake. The usual plan is to see that the two halves of the coupling meet fairly without springing the shaft in any direction and also taking notice how the faces come together and then let it go at that.

The advantage of installing a flexible coupling is to make the extreme care usually required to line up the engine and shaft unnecessary, and also to care for any slight variation in the alignment that may be caused at any time by the bending or hogging of the hull, thus saving unnecessary wear and loss of power.

As for the disadvantages, these should be set aside from the expense if a well-built reliable coupling is used. They save worry and uncertainty and are always on the job.

C. H. C.,
Saginaw, Mich.

Some Comfortable Extension Berths

The Regular All-Metal Bed-Spring Is Easily Adapted to Use in a Cruiser

THE PRIZE CONTEST—Answers to the Second Question in the January Issue

A Hinged Spring

(*The Prize-Winning Answer*)

THE accompanying sketches give a comprehensive idea of a suitable and practical arrangement of providing springs for extension berths.

The problem permits of a variety of methods, several of which have been tried with unsatisfactory results. The method shown has proven very satisfactory and substantial, is easy to operate and very inexpensive as to repairs.

As shown, the frame is built up of 1¼-inch angle iron riveted at the connections, as indicated, to form rigid joints. The hinging joint is made up, as shown in the detail, with convex washers and double nuts on bolt. These bolts should not be set up tight, just enough play should be left to allow a little side motion to the movable part of the frame section II.

The slides should be fitted at the sides where shown; sufficient room should be allowed to permit the frame to be drawn out easily. The slides answer the double purpose of a guide and as a hold-down for the frame when drawn out.

As will be noted, the springs and links are arranged on the solid frace section I to form a straight line at the joints.

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It is at this point where the greatest difficulty is encountered with most spring bunks of the extension type, no allowance being made for the bunks being narrower at one end than the other, especially when woven wire is used for a spring.

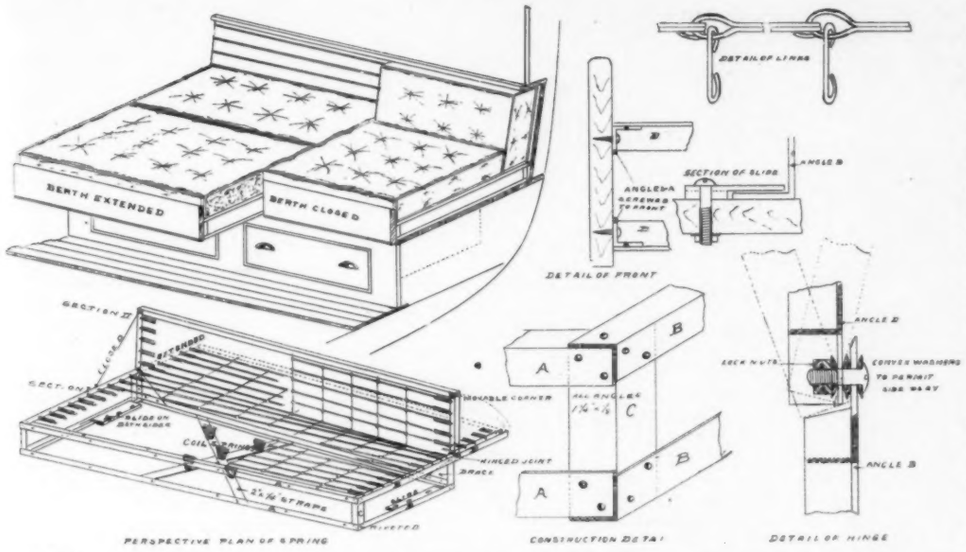
The spring and link system has the following advantage over the other types: being of separate units it is easily and economically repaired when any part is broken or worn through. Then, again, the separate link makes it adaptable to the length and width required for the various sizes of bunks as found on boats.

The coil springs are used as shown to prevent any excessive sagging of the spring when in daily use, and are easily attached to the cross braces and links.

Perhaps the most economical method of obtaining the necessary material to make up the spring would be to purchase several folding couch beds of the spring and link system. These may be easily taken apart and reconstructed to such sizes as may be required.

By following the general intent of the plans and details as to construction a good, serviceable spring bunk may be readily constructed by the handy amateur.

T. P. K.,
New York, N. Y.



T. P. K.—An extension transom easily made from a standard bed spring. The frame is built up of small angles in a simple manner. The only tools required are a hammer, drill and hack saw

A Collapsing and Folding Berth

IN planning the extension spring berth, shown in the sketches, an attempt was made to make the arrangement as simple and practical as possible.

The type of springs shown are made in a variety of styles or patterns of mesh. Some are of diamond pattern and others are composed of flat steel strips. The one shown has rectangular meshes 2 by 4 inches and seemed the most practical construction for folding. Should difficulty be experienced in obtaining suitable wire mesh, heavy canvas, about 15-ounce, could be used. There should be a wide reinforced hem all around the edges to receive the grommets for attaching the springs.

The frame is of ⅛ by 1½ by 1½-inch angle iron. It is in two pieces and should be easily made, a hack saw and file being about all the tools required. In constructing the frame, the extension or folding part should be slightly shorter, in order to fold inside of the main part. It should also be drilled to form the hinge when in folded position to insure proper location of holes.

Probably a good way to obtain the necessary material, springs and all, would be to go to some furniture store and buy a bed spring of suitable construction for this purpose. Then it could easily be remodeled so as to fold and fit the space allowed for it. Even should the frame not be of suitable construction, the springs and wire mesh could be used and new 1½ by 1½ angle iron purchased for the frame.

If facilities for drilling the small holes are not at hand this work could be done in a shop at small expense, provided the work were all laid and center punched where each hole is wanted.

At B there is a brace composed of ⅜-inch pipe between the two short legs. This is mounted at the side, as shown, in order to allow the legs to fold. It will project below the frame when folded, but could be let down into top of transom if desired. The purpose of this brace is to take the strain off the springs at this point and prevent the frame from bending at the joints.

At A is shown a brace connected near the center of frame lengthwise, for the purpose of supporting the frame at this point. It should be of wood or ¼-inch pipe and loosely hinged, so it can be folded along side of frame.

When folded the springs should be about 2 inches thick and the front piece for holding the cushions in place should have this additional height to allow for the folded springs on the transom under the cushions.

When used as a berth the springs are raised about 8 inches above transom to prevent touching the boards through sagging. This is of advantage in another way, as the boat becomes wider at this point, increasing the room available for berth without greatly obstructing the passage between.

The high front board is a necessity, as anyone knows that has ever tried sleeping on a narrow berth without one. This board is held upright by two chains connected to stout hooks on the carlins, and this also holds up the extended or folding part of berth.

C. H. C.,
Saginaw, Mich.

* * *

A Hinged Pipe-Frame Spring

THE berths in the cabin of a cruiser can easily be provided with extensions to afford additional sleeping quarters with but little initial work if the mattresses are arranged with a hinge connection at the middle and landing supports or legs are used to brace the outside frame, when the berth is extended or opened.

The sketches illustrate these methods, while the advantages are that the hinged frame, which when not in use is completely concealed by a double pad mattress, yet when the berth is opened the occupants are provided with equally comfortable quarters, while if only one occupant is to use the berth there is no need of extending the frame, for the bed is as comfortable closed as when open.

In this arrangement of a hinged frame, with legs, very little additional work is required to afford a combination of single or double berth having equally comfortable springs.

The ends of the frames are not quite twice as long as a single bed, and have only enough meshed wire and coil springs arranged over the frame extension to support the extra occupant.

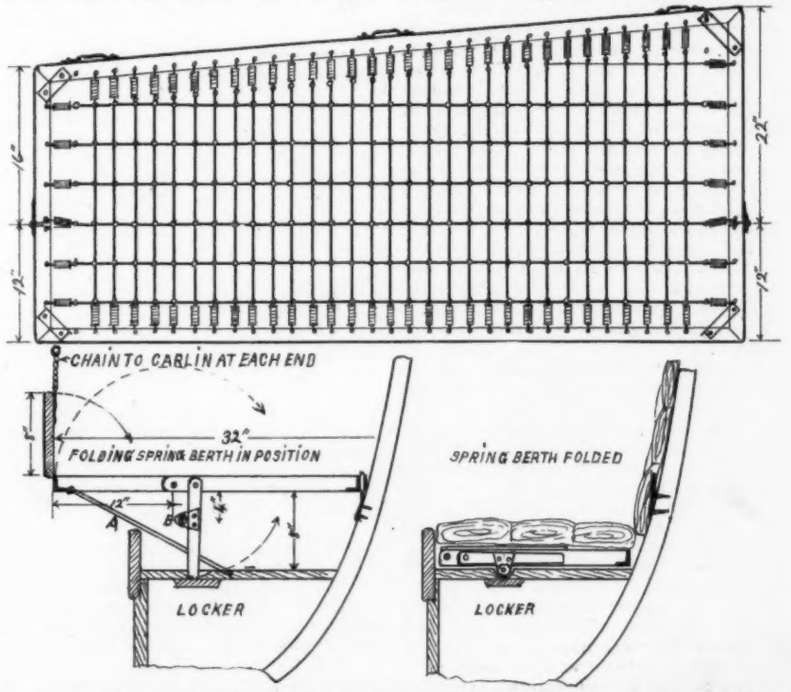
Two light hinged legs are permanently attached by bending their upper ends around the outside edge of the frame.

The materials used in the frame construction consist mainly of ⅜-inch outside diameter iron (galvanized) pipe, held together at the corners by four pipe elbows threaded on.

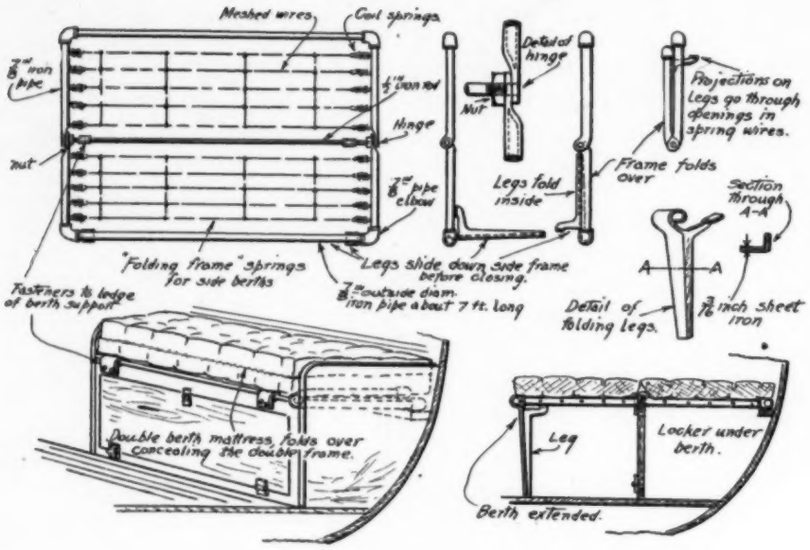
Where the fold in the frame is to be made the pipe is flattened, as shown in the illustration, and drilled through for ½-inch diameter hinge rod, having nuts screwed on near each end.

The rod serves as a hinge, as a center support for the frame and for attaching by bending iron clips with screws to the upper edge of the locker berth, so that if it is desired to use the space under the bed for a locker the berth will in no way interfere with the stowage space.

The legs are 3/16-inch sheet iron, of a length to suit the height from the floor up to the edge of the berth, and these are bent sharply to an angle making them rigid. A projection on one side of the leg fits under the end of the frame, acting as a support. This projection when



C. H. C.—Another extension berth made from the usual bed spring so arranged that it folds up in a most compact manner



G. A. L.—The pipe-frame berth idea has been successfully worked into an extension transom. This scheme can be easily adapted to almost any boat

folded inside and the frame closed must be placed to pass between the meshes in the spring wires.

Have the ends of the legs that rest on the floor when erected come somewhat inside of the extreme outside edge of the frame when it is unfolded. This makes this feature secure against slipping out and precipitating the occupant on the floor.

Five or six strands of meshed wire are needed for each half of the frame, and these are held at their ends by flexible coil springs which are fastened through or bent around the iron pipe at the ends of the frame.

The spring frame needs only a wooden ledge at the back of the berth, which is at the top of the locker, to support it, and is only fastened by the clips at the center rod. Any time it is desired to use the locker, where no side or end openings are provided, the mattresses can be removed and the double spring frame turned out, exposing the whole locker interior to view.

The mattresses themselves, which can be made alike, should be fastened together at one edge, which permits them being opened up without separating at the center. It is advisable to do this, otherwise the pads will slide apart, making the bed uncomfortable over the open crack. It is obvious that the sizes are variable, being made to conform to the size of the berth on which they are to be used. G. A. L.,
Washington, D. C.

How I Shall Improve My Cruiser

A Subject on Which Every Motor Boatman Has His Own Ideas to Meet His Requirements

THE PRIZE CONTEST—Answers to the Third Question in the January Issue

A Rainy Day Wrinkle

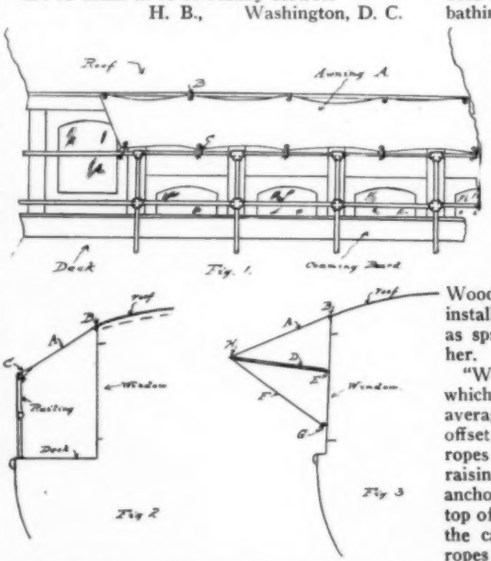
(The Prize-Winning Answer)

AMONG the long list of improvements which I, like every boating enthusiast, make up every year to be adopted before the next season opens, the one which I expect will afford the greatest satisfaction is a set of awnings for the cabin windows. One of the great drawbacks to the otherwise delightful sensation of lying at anchor during the pouring rain and listening to the patter of the drops on the roof, is the fact that almost invariably it is necessary to close the windows, and this causes the cabin to soon become hot and stuffy. After the successful trial of experimental makeshifts, I have designed some awnings for my boat which, by slight modification, as indicated herein, can be adapted to any ordinary cabin. The general outline is shown in the sketches. Figs. 1 and 2 show the arrangement for a boat having a deck railing outside the cabin. The awning A is fastened by hooks, B, to the edge of the cabin roof and held to the railing at several points by cords, C. This awning strip will be made long enough to stretch as far as desired along the side of the boat, and need be only about 12 inches wide to keep rain from driving into the windows.

If the cabin is flush with the sides of the hull Fig. 3 may be followed. In this figure the awning is fastened to the roof edge as before, and wooden struts, D, about 1 inch in diameter are provided, their outer ends being hooked into eyelets in the awning at H and their inner ends hooking into screw eyes, E, in the cabin side. Guys, F, fastened to the outer ends of the struts and to the screw eyes, G, hold the awnings stretched taut. These guys, F, should be run diagonally fore and aft, and not at right angles to the keel.

It is to be understood that these are light, temporary awnings, and not necessarily even water-proof. They are intended merely to prevent rain beating into the windows, and thus to allow the cabin to be well-ventilated even during a heavy rain, when it usually is necessary to shut the windows. Either type of awning can be readily attached or detached from the inside by reaching out through the windows, and they are so small as to be readily stowed.

H. B., Washington, D. C.



H. B.—An awning that will be appreciated by every motor boatman who has tried to live aboard during a spell of rainy weather

A Scheme for Raising the Anchor

THE greatest comfort and peace of mind to a motor boat owner is the knowledge he has of the strength and holding qualities of his ground tackle, but in the past little has been done or figured out to simplify the handling of such ground tackle for a one-man boat of or under 50 feet in length.

How often a man owning a one-man control motor boat will put off a trip or short run because he is unable to find some one to go with him to help with the anchors while he manages the boat, and how many times will a boat owner unwillingly pass a beautiful cove or bathing beach without stopping, because of the trouble of pulling up his heavy anchors, and oh! how many times has he been forced to throw out an extra anchor to keep from dragging into a dock, when he could just as well have hoisted his one anchor (with a proper and easy system) and moved his boat to a better holding ground, or in the lee of something, without moving from his pilot wheel and controls.

While cruising last summer I saw the following system worked out on the 32-foot motor boat "Whisper" of Woods Hole, Mass., and have decided to install the same system on my boat just as soon as spring opens up and I ca. get to work on her.

"Whisper" is equipped with hawse pipes, which stand more nearly perpendicular than the average, and the hawse-pipe deck plates have offset rollers, or pulley rollers, which give the ropes free play, thus making pulling easy when raising the anchors. The ropes pass from anchors through hawse pipes, over rollers at top of hawse pipes, thence back over the top of the cabin deck to cleats in the cockpit; the ropes are then stored away in boxes for that purpose, one on the starboard and one on the port side of the cockpit just under cleats. The owner of "Whisper" very kindly explained the system to me and said that New Bedford whale rope should be used, it being very strong, pliable and soft and would not cut or hurt the hands when pulling up the anchors.

E. C. V., Indianapolis, Ind.

* * *

Mostly Power Plant Improvements

MY improvements on my 40-foot boat for 1918 are as follows: Life preservers were always carried under my folding cot. This year they will be stowed away under

after deck, but where they can be reached at a moment's notice.

I will have boarding steps, as shown by Mr. Kelly in January issue of the Prize Contest.

My engine is now equipped with gravity feed oiler, and this will be replaced with force-feed oiler, first to save oil, as we often forget to turn same off at once after shutting down the engine; secondly, as the temperature causes oil to be thin or heavy, the force will insure uniform feed.

My firing system is at present single spark to each cylinder through distributor, but as the engine is of such high compression this at starting often goes back on me. I will install a good single-unit buzz coil, with distributor, which I think will be much better.

My exhaust is not water-jacketed and gets very hot, as we cannot put water in same as the outlet is under the third cylinder, and when water was tapped in the end of the exhaust pipe the first three cylinders blew the water to the outlet of the fourth cylinder, thereby causing this cylinder not to fire. This will be changed by getting four flanges not tapped and fitting in place of the present ones to engine, tapping out for extra heavy short nipples and connecting these with ell on front cylinder and short nipple to tee on second cylinder, this tee, with short nipple to tee of fourth cylinder. On the tee of the fourth cylinder, after end, will be fitted a flange to take care of the exhaust pipe to go overboard. By installing this new exhaust manifold, I can tap a ¼-inch water pipe in the ell on the front end and the water cannot go to the cylinders, but be blown right out overboard, and this will keep the manifold cool with the exception of the short nipples from the flanges to the tees, which will not amount to much.

On my electric light system I am using 6- to 8-volt lamps, and as the boat is 40 feet long, and when burning three or four lights at one time the voltage drop is very noticeable with a 6-volt battery, I am going to have an extra cell attached to this, making it eight, and then will have about the normal 6 volts, when burning my lights, as we always have three or four 16 c.p. lamps burning at one time. The battery, by the way, is a 250-ampere hour one.

C. G.,
Baltimore, Md.

* * *

General Improvements Throughout the Boat

IN the first place, I intend to raise the water line on my boat about 2 inches, in order that I won't have so much labor next summer scrubbing and painting to keep the white paint clean and free from traces of scum and grease that is picked up in rivers.

Secondly, I am going to hinge the military mast on the boat and put a long coil spring in the guy line that goes to the bow of boat, so that when going under bridges I can pull the mast down from the cockpit and need not go forward and take it down completely.

In place of the old tin horn that is used as a foghorn I am going to take a conch shell and file off the closed spiral end, and will then have a horn that will be loud enough to be heard for miles, and is far superior to any other horn for a small boat.

My reverse gear is located some distance from the helmsman and makes it necessary to have an extra person to operate the boat. I am going to copy one of the excellent designs submitted in the recent prize contest of MoToR BoatinG and bring the reverse controls to the wheel.

Oil running lights are a nuisance, therefore, being possessed of a storage battery and generator I shall wire the boat for electric running lights and use adapters to change present oil lights to electric.

Hot water, so useful on a boat, is expensive at the present price of alcohol. By running a coil of copper tubing about the exhaust pipe and connecting same with a small storage tank located in a nearby locker, I expect to always have hot water after the engine has been running for some time.

The gasoline tank of my boat is beneath the rear deck and in a seaway the gasoline does not feed freely. To remedy this I shall place an auxiliary tank in one of the side lockers and connect pipe to carbureter with a three-way valve, so that I can shift from one supply to the other at will.

Over this tank will be placed my tool tray, divided into sections, to accommodate various tools and supplies. This tray, being alongside the engine, will be handy when making adjustments or repairs to same.

Pumping bilge water with a hand pump belongs to the dark ages, so I shall spend a few dollars for a pump that will operate from the flywheel and let it do the work while I enjoy the ride.

The "cook" has entered complaint that she is tired of washing dishes on the back deck, so next year we are going to install a small sink in an unoccupied space just over the muffler and equip it with proper drains and a small pump connected outboard beneath the waterline.

Last season I had one set of spark coils and considerable trouble; this year I shall wire two sets of batteries with two sets of spark coils and eliminate trouble.

Several cork life preservers which cluttered up the boat last summer are to be stripped of their canvas covers and the cork blocks are to be inclosed in a life raft, which will be made to fit the after deck and covered with oak slats to form a seat. This raft will be handy to push overboard in case of accident and will support several persons in the water.

MoToR BoatinG's Practical Handbooks

Six volumes containing the best of the Prize Contest Answers for the last eight years.

See special offers on page 24.

A self-registering gauge will be inserted in the gasoline tank and obviate the necessity of keeping a stick on hand to measure with and which can seldom be found when wanted.

A new spot light will render coming to a mooring less hazardous on a dark night.

Last year's lavatory was a tin pan—a folding one of white metal will adorn the cabin this spring and will be piped to a storage tank located in the chain locker.

It seems to me that I have booked a rather large contract for myself this spring, so had better stop and get at doing some of the work.

C. C. F.,
Chicago, Ill.

* * *

Cruiser Convenience and Comfort

TO attempt to specialize on any one improvement or addition to the equipment of a cruiser for the convenience and comfort of the owner and his guests, when there are many valuable helps, would be an injustice to the subject. On many of the cruisers it would be hard to find a single improvement that could be made. On others, there are so many lacking that it would be hard to decide which to install first. We will touch briefly a few of the many comforts and conveniences aboard a cruiser, and leave it to the owner to decide which he has not but most desires.

On a new, up-to-date boat electric cabin and running lights are invariably found. The outfit may be an elaborate dynamo and storage battery system or simply a series multiple set of dry cells. Both are efficient and the dry cell outfit can be installed by any one capable of running a motor intelligently.

Running hot and cold water is a great convenience. A water tank is installed below decks and the water delivered to the outlets by air pressure.

There never was a man who didn't enjoy a good bed. Experience will teach that a good, comfortable extension berth is a necessity for cruising.

When cruising it is advisable to take along a presentable suit of shore clothes and a clean shirt. No suit can be presentable after two weeks of daily trips to and from a suitcase. A clothes closet built in some little used corner where the shore clothes may be hung up and kept in good condition will soon pay for itself in tailor's bills. A rod lengthwise through the closet to hang the clothes hangers on will allow the greatest amount of clothes in the least amount of space.

An ice-box is not to be despised; either built in or carried in the cockpit its value is the same. All the perishables can be kept safely and who can refuse a nice cold drink on a hot day?

Mealtime for the cook means all work while the others enjoy themselves. Why not have a fireless cooker and help out the unfortunate? The cooker is simply an insulated wood or metal box into which the dishes are placed after being brought to a heat. The box, being insulated, holds the heat and the cooking goes on unattended without danger of burning.

In hot weather the cabin becomes very warm. A couple of air scoops placed out of the port holes or a cowl ventilator on deck will do much to make the cabin comfortable in summer.

Steering on a long run becomes a tiresome job. The play vanishes and it becomes all work. An easy seat at the wheel, with a comfortable back and convenient foot rest, will cheer up the tillerman and make him smile. The convenience of having the reverse gear control within easy reach from the steering wheel will be readily recognized.

Sometimes the wheel is held in one position for several minutes. An arrangement similar to a band brake attached to the drum, or a patent steering wheel, will relieve the muscle tension, lightening the labor. This arrangement would be valuable when single-handling it.

The steering lines are generally wound around the drum from each end and fastened at the center with a screw or nail. Try winding each line separately, starting at the edge of the drum. This will allow each line to lead off straight from the center and eliminate any chance of their riding on top of each other.

In heavy weather a windshield in front of the wheel will protect the steersman. It may be removable or disappearing by sliding down into a pocket inside the cabin bulkhead.

Tools without a place to keep them can never be found when wanted. Make a toolbox of ½-inch lumber. Put a partition 3 or 4 inches from the bottom and keep all small parts and little used tools in the bottom. The top is for the most used ones.

Life preservers have the habit of getting all over the boat if not properly cared for. Light racks under the cockpit seats will keep them out of the way, where they are always dry and ventilated, which is necessary to preserve the covering. "Life Preservers" on the door will tell every one where they are.

Screens for the port lights and windows and mosquito net curtains for the cockpit will keep out insects attracted by the light. The screens may be on wire frames for the port lights and wood frames for the windows. The curtains roll up in the same manner as the storm curtains, and may be fastened with grommets in a strip of duck sewed to the ends.

Here are a few easy ones. There are many more, but space is limited. The construction of most of them has been fully explained in MoToR BoatinG and a little ingenuity will supply all that is needed for making the others.

W. B. M.,
Newburgh, N. Y.

Motor Boats Assume a Martial Mien

Slight Changes in Boat and Engine Design Significantly Show the Stability of the Motor Boat Industry
Tried and True Types Always Demanded With Little Variation Once Proven Satisfactory

IN no line of industrial endeavor that has to do with the carrying on of the war has there been greater activity and progress than in the motor boat industry and 1918 marks a new epoch in its life for the fourteenth annual National Motor Boat Show at Grand Central Palace was the first wartime exhibit of motor boats, motors and accessories.

American marine engines as well as American guns and ammunition have played a strong part in stemming the Teutonic quest for world domination and in practically every allied navy American-built motors predominate in the thousands of small craft which are fighting the submarine and doing patrol duty. The National Show also furnished the American manufacturers the opportunity to display their goods before the big foreign buyers now in America.

Interest in the exhibition, however, was not confined to the Naval and war features for the pleasure and work boats consumed a large part of attention. It is from the ranks of the pleasure boat fraternity that the Navy has recruited its thousands of men to man the hundreds of coast patrol and submarine swatting craft now in service and whose numbers will be steadily increased as the war goes on.

One thing that is of intense significance and which strikingly denotes the stability of the motor boat industry is the fact that there have been so few changes in engine and boat design.

It is only when a product is practically perfect that necessity ceases to mother invention to produce still further wonders. In the last few years the marine motor has become a mechanical marvel so complete and so dependable that mere man seems to have hesitated at changes.

The boat and engine industry has become a steady growing business completely past the experimental and freak stage.

All the tried and true models were at the show with perhaps a carbureter changed here a new starting and lighting equipment there, but in the main there have been very few variations.

Hundreds of soldiers and sailors filed into the show as the guests of the National Association of Engine and Boat Manufacturers and the sailors in particular took a lively interest in the nautical novelties that were displayed in the accessory booths and in the comfortably upholstered cabins of the cruisers and pleasure craft on exhibition on the main floor.

The fact that all the patrol boats and submarine chasers are now in actual service prevented the possibility of their being present at the show. But it is to be expected that the patriotic public much preferred that the craft be after the Germans than at the Palace for their edification.

The largest craft at the show was the Speedway, a 62-foot cruiser, fitted with two six-cylinder Model M Speedway motors, each of which develops from 130 to 150 h.p. Two duplicates of this model are now in patrol service, one at Newport and the other at Norfolk, but these are equipped with eight-cylinder motors, which develop 25½ m.p.h. All told there are eight of these boats now in Government service.

Another interesting boat was a modern 40-foot fishing boat, capable of running at express speed and with attractive accommodations for four persons in the cabin forward. There is a bridge deck arranged just aft of the cabin from which the boat can be controlled entirely by one person. Directly beneath the bridge and accessible through a large hatch in the bridge deck, and through a locker at the after end of the cabin, is a modern Model M Speedway six-cylinder engine complete with electric starting and lighting system. Following the bridge is a large cockpit arranged for wicker chairs with a thwart seat at the after end. The gasoline tanks are located beneath the cockpit and have a capacity of 125 gallons. This boat is not only serviceable as a fishing boat but is also adapted in every way to pleasure cruising. With half in the locker at the after end of the cabin beside the engine and half under the companionway stairs is an extra folding pipe berth that is decidedly usable and which is actually out of the way when not wanted.

One of the coziest little cruising boats at the Show and one which attracted no end of attention was a little 32-foot trunk cabin cruisette in the Elco Company's section. This boat, although only 32 feet long, combined in its compact interior most of the features of the giant 62-foot Speedway cruiser shown by the Gas Engine and Power Company. The Elco cruisette has a spacious forward cabin with a fine cockpit sheltered by a substantial awning. It has all the features that attract the man with a limited pocketbook and a desire for life on the deep.

The handsome teak yacht tender designed and built for the Stamford Yacht Club by the Luders Marine Construction Company is 32 feet long, with an 8-foot beam and has a forward and an after cockpit, the latter protected by a low shelter cabin. It is equipped with a 10 h.p. Palmer motor.

Another exhibit which brought home with force the grimness of sea travel in these days was a modern 40-foot lifeboat shown by the Mianus Motor Works. This boat, built to withstand the heaviest weather, was shown with full equipment including water cask and provision lockers. And almost directly above it on the mezzanine floor were shown water-proof life saving costumes which enable the wearers to stand upright in the water without danger of becoming wet or numbed with the cold.

The ice-boat, which is driven by an airplane propeller attached to a two-cylinder four-cycle aviation type motor was something of a curiosity. The boat is from a design by Pierre Proal and was built at the Red Bank Yacht

(*Continued on page* 58)

The Magnet

THE new arrival who was looking for a crowd around a screen always easily indentified MoToR BoatinG's booth at the fourteenth annual Motor Boat Show at Grand Central Palace, for even during the dullest part of the day forty or fifty people were always at the booth, keenly interested in the films, in the magazine and in the six practical handbooks that MoToR BoatinG has just published.

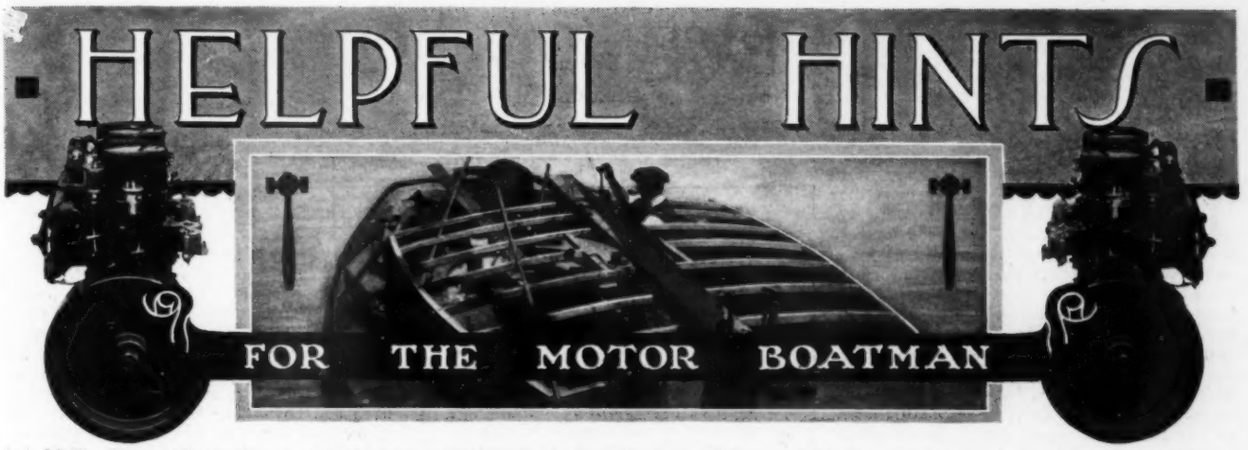
The films were intensely interesting, for people always like to see the wheels go round, and fully justified the immense amount of expense and labor which had been expended to produce them. Among the pictures shown were views of the world-famous British submarine chasers and of Scout, the express cruiser used to carry Government officials between Indian Head proving grounds and Washington, pictures of engine-building operations in every stage, accessory manufacturers, the making of MoToR BoatinG and many showing other activities in which the motor boat takes part.

The making of the magazine was shown from start to finish, the editorial department, the advertising department, the circulation department, the art department, the printing in detail—all in actual operation—even one of the sailor lads who are constantly dropping into the office to settle some technical dispute or to get authoritative information on some subject in which they are interested.

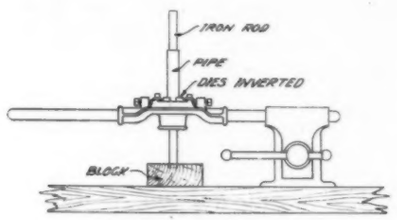
Over 8,000 feet of film were used to bring the leading engine and accessory factories to the Show, as they did to all intents and purposes, for these films gave a most comprehensive idea of the making of motors and boats.

MoToR BoatinG had the biggest space of any mgazine, the most artistic decorations, the most interesting exhibit and most important of all—constantly the largest crowd at any one booth at the Show.

One corner of MoToR BoatinG's booth at the recent Motor Boat Show. On the right will be seen the screen used for the motion picture exhibition



It is MoToR BoatinG's *purpose to publish every month under this heading such methods and "kinks" as motor boatmen have found helpful to them in their enjoyment of the best of all sports. The subjects will not be restricted to any particular phase of boating but will be as varied as we, with the help of our readers, can make them. To help make this page a success we want our readers to send us short accounts of the little things that have helped them out of their difficulties or stopped the little annoyances that seem bound to occur every so often.*—Editor.



A guide for threading pipe

Cutting Threads Accurately on Short Pieces of Pipe

When cutting threads on short lengths of small or thin pipe it is generally a troublesome operation to get them started square with the pipe. It will be of great help in doing this if the die stock is held in a vise, with the guide down and the dies reversed—that is, put the dies in the stock upside down.

Take a piece of iron pipe or an iron rod that will just slide into the pipe to be threaded, put it through the dies and secure the lower end in a block as shown in the sketch. Be sure that the rod is square with the dies.

Slip the piece of pipe to be threaded down over the rod and start cutting the thread. A pipe wrench can be used for turning the piece being threaded.

Care must be taken when putting the dies in the stock to see that the cut of the two dies will register. It is sometimes necessary to put a thin shim under one of the dies to bring it into line with the other.

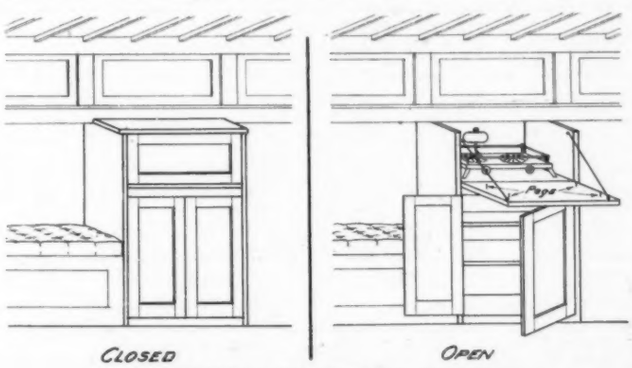
Fresh Water for Washing and Cooking Purposes

Those who live on board their boats constantly realize the necessity of a supply of fresh water. The usual mode of procedure is to find a dock where water may be secured, but many times the dock is not at hand when the supply in the tank becomes exhausted. Therefore the question of fresh water gives considerable concern. Another and more expensive way is to wait for the water boat to come around, and this is most uncertain. Strange to say most ice-boxes are built to have the water drain off either into the bilge, which is very bad practice, or overboard, which is an extravagant idea. A drain cock to lead off the melted ice-water, which on first thought may be considered more or less of a nuisance as it drains about half a bucket three times a day, will provide water which is useful for washing purposes, cooking vegetables, and in case of emergency may even be used for coffee.

A Folding Galley

On small cruisers it is sometimes desirable to use the space occupied by the galley stove for other purposes, when not actually preparing a meal. The sketch illustrates a folding galley as built into a trunk-cabin cruiser.

When closed it has much the appearance of an ice-box. The top is removable, being held in place by cleats on the under side. The front is hinged at the bottom, held closed by hooks at the top on both sides and supported when opened by chains. Below the stove it is fitted with shelves for the cooking utensils, supplies and such things as are usually found in the pantry. The stove compartment should be lined throughout with zinc, galvanized iron or copper. An alcohol stove is shown, but other types can be used.



A compact folding galley suitable for a small cruiser

When not in use the stove is set back in the compartment and held in place by pegs which fit into the screw holes in the legs. Another set of pegs are provided on the drop front to hold the stove in place while in use. A low type of stove should be used as a high stove would be liable to tip over when not held down by screws or other fastenings.

To Prevent Set Screws Working Loose

Trouble caused by set screws working loose can often be avoided by the following method of making them tight. To begin with use cup-point set screws. Spot the shaft with a twist drill, turn the set screw up as tight as you can with a wrench, then give it two or three sharp blows with a hammer as you would a nail. You will find that the set screw can then be turned up just a little more. By repeating this process several times the set screws can be put in so tight that there is very little chance of them working loose.

Cutting Odd Threads

There are times when it is necessary to cut a thread on an engine part that is not a standard bolt thread. When such a case is at hand, do not forget that pipe dies in an adjustable stock can be used for cutting bolt threads, and that they will cut threads on bolts that vary somewhat in diameter from the size of the pipes on which they are intended to be used. The ½-inch dies cut 14 threads per inch, the ⅜-inch cut 18 threads, the ¼-inch cut 18 threads and the ⅛-inch cut 27 threads to the inch. By careful work and making about four cuts to finish the thread, the ⅛-inch pipe dies can be manipulated so as to cut 28 threads to the inch.

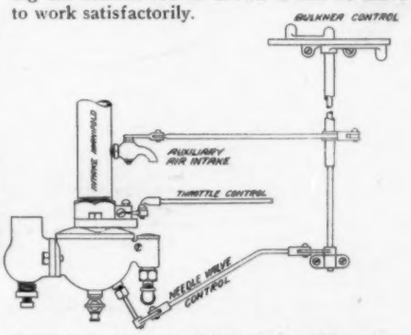
Outside Control for Carbureter Needle Valve and Auxiliary Air Intake

It is often desirable after the engine has been run for a short time and warmed up to adjust the carbureter needle-valve so as to feed less fuel. The accompanying sketch shows an arrangement for doing this from the deck by rigging up an outside control. A brass lever is attached to the needle-valve stem by a set screw and drilled for a pin to take the end of the control rod. This allows for a movement of the needle-valve of about 90 degrees, enough for all ordinary adjustments.

An auxiliary air valve is shown attached to the intake manifold. The valve shown in the sketch is an ordinary L-handled pet cock with the handle arranged to take a control rod, but any of the various "gas-savers" can be used.

Both of these valves are worked from on deck near the other controls by means of rods and a pair of ordinary brass control levers. The arrangement shown in the sketch will, of course, have to be revised somewhat for each individual case.

On some carbureters, such as the Schebler, the needle-valve stem is inclined, but by bending the control rod as shown it can be made to work satisfactorily.



Controls for close regulation of the mixture from the deck

My Ideal Runabout

No. 2, L'Allegro, a 25-Foot V-Bottom Ship

By E. C. Stock

YEARS ago in a South Jersey town the wave of enthusiasm for the sport of motor boating reached me. And at that time any boat that floated and moved, as long as it was not a rowboat, pleased me and made me ambitious to own a boat and say to everybody, "This is my boat," and not feel apologetic. As time went by circumstances permitted a boat to come into my hands. She was a tubby one, almost as broad as long and with small freeboard. As she was built on an inland body of water, she suited the conditions there, but when placed in Barnegat Bay, things were different. Flare on her bow was unknown and when going through a head sea the guests were given an unpreventable wetting. Then again her stern which was a fantail, would settle, and even a moderate speed was out of the question. It was during this period that ideas of my own were beginning to form as to what constituted my ideal runabout.

Later, a hull of the V-bottom semi-speed type was procured. This boat had a flare and kept the water out of the boat, where it does not belong. The stern was of the transom-type and squatting was reduced to a minimum, and with a 7 h.p. engine turning 650 r.p.m., a speed of 11 m.p.h. was obtained. So, even with this limited experience I have ideas as to what my ideal runabout must be.

As to general design, it must be of the V-bottom type, as I believe this is superior to the round-bilge boats for this length, *i. e.*, 25 feet. I have seen both types in wet weather on Barnegat Bay, and to my mind the V-bottom was the easiest sea boat. It must have a long forward deck, which will protect the passengers, yet must be accessible. The cockpit must be large and comfortable. And last, but not least, a moderate speed must be attained. The V-bottom type is more easily driven than the round type, and I judge roughly L'Allegro will attain a speed of 18 or 20 m.p.h. Having had about six years' experience with a Fulton engine I shall decide upon a Fulton as my ideal power plant.

As will be seen by the drawing, the lines of the boat are fine, but not extremely so. Especially is this noticeable in the forward sections. I think this will make her a better sea boat when going into a head sea. The reserve buoyancy forward should minimize the heavy flare, but I think this flare absolutely essential, as Barnegat Bay is inclined to choppiness and spray is well known. The lines have the greatest beam amidships and get finer on going to stern and bow. The beam, 5 feet 2½ inches on the load waterline, is large, but I think this will not only give more speed but will also make the boat more comfortable.

The general details will now be touched upon. First of all, when you anchor, the end of the anchor line should be tied to something secure. Therefore, my samson posts are 3 by 3 inches, of white oak and stepped into the keel.

A breakwater built of ⅞-inch white oak is built upon the deck, forward of the hatch. This will help in keeping the water from getting into the engine compartment.

A cowl ventilator of seamless copper will be placed aft of the breakwater and forward of the hatch. For ventilating the engine compartment this is necessary. As for the hatch, it must open outwards, and I have adopted the design of one published in MoToR BoatinG, issue of March, 1917. As the hatch was completely detailed, I did not redraw it.

I here also show a windshield, and this may or may not be built.

The running lights will be electric. The storage battery will be located in the engine compartment, and all switches will be brought to the bulkhead. The stern light will be upon the top of the ensign staff, and the port and starboard lights will be placed directly forward of the breakwater. As said before, all controls will be placed upon the bulkhead, within easy reach of the helmsman. There will be a light upon the bulkhead for illuminating the helmsman's con-

My Ideal Runabout

L'Allegro, the second of the series of Ideal Runabouts, is a 25-footer designed to meet the special conditions encountered by a small boat on Barnegat Bay. The cockpit arrangement follows the general practice with a divided front seat, space for chairs, and a lazy-back seat at the after end.

The forward sections show a good flare with ample reserve buoyancy made necessary by the choppy seas often encountered on the Bay. The forward deck is also layed out with due consideration for seaworthiness. It was made long enough to protect the occupants of the cockpit from spray; the breakwater will prevent the water picked up on the bow running back over the hatches and into the cockpit.

The Ideal Runabouts described each month in MoToR BoatinG will be only those which have been designed by amateurs, motor boatmen who know from their own experience what type of boat would be ideal for their individual requirements.

For each set of plans published we will pay $35 in cash. At the end of the series a poll will be taken and every subscriber to MoToR BoatinG will have an opportunity to register his preference. A prize of $75 worth of boat equipment of his own selection will be given the amateur designer whose boat receives the greatest number of votes.

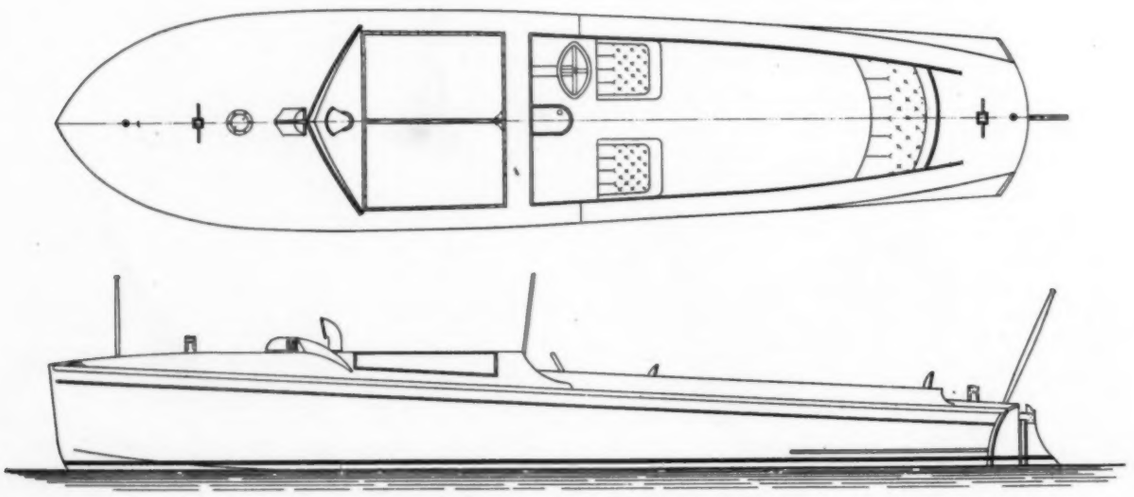
If you are an amateur who has ideas on the subject, we should like to publish plans and descriptions of your Ideal Runabout.

Table of Offsets for "L'Allegro"

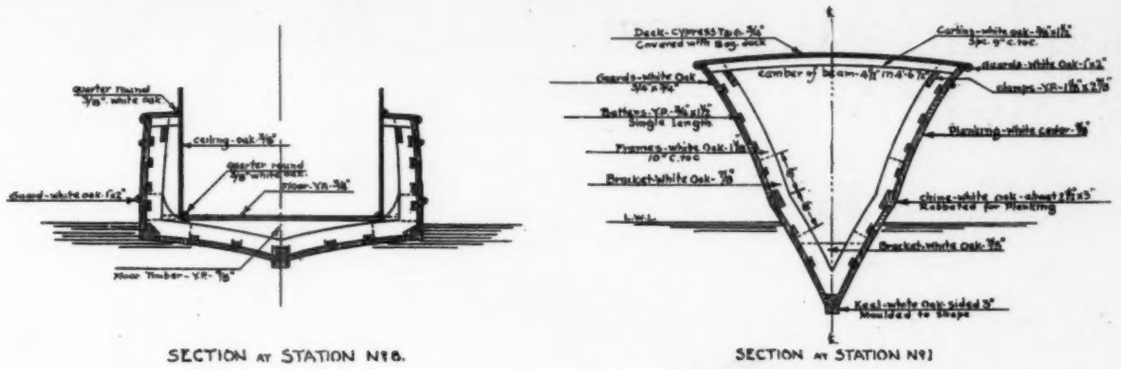
	Stations	Frame Pattern	1	2	3	4	5	6	7	8	9	½ Aft
Heights	Sheer	4-10-0	4-8-4	4-7-0	4-5-6	4-4-1	4-2-7	4-1-1	3-11-7	3-10-0	3-8-5	3-6-4
	Chine		2-5-0	2-2-0	2-0-6	1-11-4	1-11-0	1-10-4	1-10-0	1-9-7	1-9-7	1-9-7
	Rabbet		0-8-0	0-6-7	0-7-4	0-8-4	0-10-4	1-0-7	1-3-2	1-6-0	1-8-4	1-10-3
	Keel		0-7-2	0-6-0	0-6-5	0-7-5	0-9-5	1-0-0	1-2-3	1-5-1	1-7-5	1-9-4
Half Breadths	Sheer		2-3-2	2-9-2	2-10-0	2-9-7	2-9-0	2-7-4	2-5-4	2-2-7	1-9-7	1-4-0
	W.L.3.A.		1-6-0	2-3-0	2-6-4	2-7-4	2-7-7	2-7-3	2-5-4	2-3-7	2-1-0	1-11-0
	W.L.2.A.		1-3-1	2-1-1	2-4-7	2-6-7	2-7-5	2-7-2	2-5-3	2-3-7	2-2-0	2-0-0
	W.L.1.A.		1-1-0	1-10-1	2-4-0	2-6-4	2-7-4	2-7-1	2-5-2	2-3-7	2-2-0	2-0-0
	L.W.L.		0-11-4	1-9-0	2-2-7	2-6-0	2-7-2	2-7-1	2-5-2	2-3-7	2-2-0	2-0-0
	W.L.1.B.		0-5-4	1-0-0	1-5-0	1-7-0	1-8-0	1-7-0	1-3-7	0-10-0		
	W.L.2.B.		0-2-1	0-6-0	0-7-5	0-7-3	0-5-0	0-1-4				

Diagonal "A" intersects perpendicular 2'-6" above Base Line—2'-9½" out on Base Line
Diagonal "B" " " " 3'-0" " " " —6'-4" " " " "
Diagonal "C" " " " 3'-9" " " " —10'-4" " " " "

Station 5 is amidships—Stations spaced 2'-6" apart.
Buttock No. 1 is 10" out and Buttock No. 2 is 20" out from perpendicular.
Base Line is 2'-1" below L.W.L.—Dimensions to outside of planking.
Length is 25 ft. · Beam at #5 is 5'-2½" on L.W.L.—Draft is 19 inches



Outboard profile of L'Allegro. Scale: ¼-inch equals 1 foot



SECTION AT STATION N°8. SECTION AT STATION N°1

trols and switches. A line trouble lamp will also be connected to the battery, and will be placed in the engine compartment, where it can be used to advantage. These lights are all that will be needed.

The steering-wheel has been placed on the starboard side of the boat, and all controls will be brought to the bulkhead within easy reach of the helmsman. The reverse gear will protrude slightly into the cockpit and will be entirely enclosed. This arrangement has the advantage of easy access to the interior of the gear for adjustment and does away with the need of climbing into the engine compartment. The edges of the box which encloses the gear will be bound in strap brass. This will reduce the wear on the box considerably.

The seats will be upholstered in imitation leather. The upholstery will not be permanently fastened, but be loose and used as life preservers in case of emergency. The forward seats are divided, which permits access to the after portion of the boat. I have only shown three seats, but the cockpit will be fitted with linoleum. Linoleum has the advantage of being readily cleaned and also does not show wear as a painted wood floor will do.

Lockers, which are much needed on the small boat, are placed in the stern seat and under the two forward seats. These will suffice for the additional life preservers and equipment.

Gasoline is carried in a tank placed under the deck forward of the engine. This tank will be built of copper and have a capacity of about 35 gallons. I think this tank of sufficient size for use upon Barnegat Bay, because numerous fuel depots are along its shores. Lubricating oil will also be carried in a tank strapped to the under side of the forward deck beams. I think 10 gallons will be all that is necessary. By placing these tanks near the engine certain advantages are obtained. The oil is near the engine, where it will be used. The gasoline tank is connected to the carbureter, and thus a shorter line is used than if the tank were placed under a seat or elsewhere. A steady flow of the fuel is always insured in this way.

A collapsible automobile top will also be provided. This top will be of the portable type, as I believe the portable ones more serviceable than a permanently built one.

The rudder is of the outboard hung type. I have heard some men say that an outboard rudder is easily damaged when reversing.

I maintain that a careful helmsman will not reverse in such manner as to endanger the rudder, and the advantage of the outboard rudder overbalances the danger of damage. For cleaning the wheel of sea grass this rudder will not be in the way, and last, but not least, in ideal boats it improves the beauty of the boat, especilly when viewed in profile. The rudder, as are all fittings, will be of bronze, thus insuring long life.

A white-oak guard 1 by 2 inches, half-round, is placed along the sheer and also immediately above the waterline to protect the boat. Another, ¾- by ¾-inch, half-round white-oak moulding, is also placed about 3 inches below the sheer. I must confess that this is more for looks than service.

The sections at stations 1 and 8 give clearly the size of pieces and method of construction. The general construction is of the seam and batten type, which is the best method employed today in my mind.

The keel is the backbone of the ship, and, therefore, it must be capable of carrying any strains which will be experienced. In the opinion of most men, white oak is the best wood for this service. Therefore, I have made my keel of white oak of 3-inch dimension. The frames also have quite a lot of strain upon them, and I will make mine of white oak. The chine, which is a weak point in V-bottom boats, is built of a solid piece of white oak. While this will cost more than a built-up chine it will be stronger, and I think the weak point will be eliminated.

The battens, clamps, floor timbers and flooring will be yellow pine. This wood is relatively cheap, while at the same time is very strong. I have decided upon white cedar for planking. This is undoubtedly the best wood for constant immersion in water. It is also very easy to work, which is in its favor.

The decking of L'Allegro will be cypress. As this will be covered with canvas ducking I expect to get a really serviceable and good-looking deck.

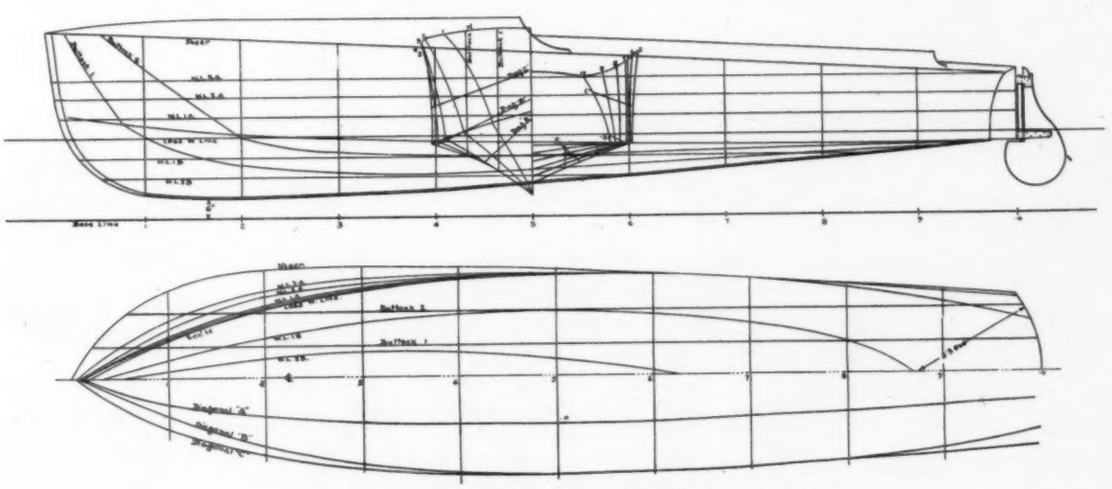
A bright deck may be all right in the spring, before the sun has opened the seams, but for really good service about the only thing for a deck is canvas.

The exterior finish of L'Allegro will be nothing radical. Anti-fouling green below the waterline and white enamel for the topsides will be used. Decks will be a buff color and the oak will be natural finish. The cockpit will be natural finish and will harmonize well with the upholstery.

Although L'Allegro may not be one of the fastest boats on Barnegat Bay, I shall have a boat that will travel at fair speed, and at the same time one that will be dry and comfortable when the wind picks up those choppy little waves that made things so unpleasant aboard my first boat. With the motor under the water-tight hatches, and the breakwater to turn the worst of the waves, L'Allegro will be a really seaworthy runabout—one that can stay out with the best of them when the wind gets down to business.

When my ideal runabout is completed and in commission I shall have a boat that is adapted to the conditions to be met with on the Bay and also one that will comply with my own requirements. Then, as with my first boat, I can say "This is my boat" and not feel that an apology is necessary.

The description of L'Allegro is now about finished. Numerous small details have been purposely omitted which would have been a burden to the readers. I have attempted nothing radical in designing L'Allegro, so I expect that she will be a reliable and seaworthy boat when placed in her natural home.



Lines and body plan of L'Allegro. Scale: ¼-inch equals 1 foot

The Knox Valve-in-Head Marine Motor

ONE of the new four-cycle marine motors for 1918 is the Knox, a valve-in-head type, with the cylinders cast in pairs, that has just been brought out by the Knox Motors Associates, of Springfield, Mass., the builders of the Knox tractor motors, a concern that has been building gasoline engines for eighteen years. The 40 h.p. motor is a four-cylinder machine with 5-inch bore and 5½-inch stroke.

The upper and lower parts of the crankcase and the reverse gear housing are cast from a special copper-aluminum alloy, and are provided with heavy ribs and webs to assure a rigid support for the cylinders and crank shaft. The cylinders are cast from a special alloy iron and are heat-treated before being ground.

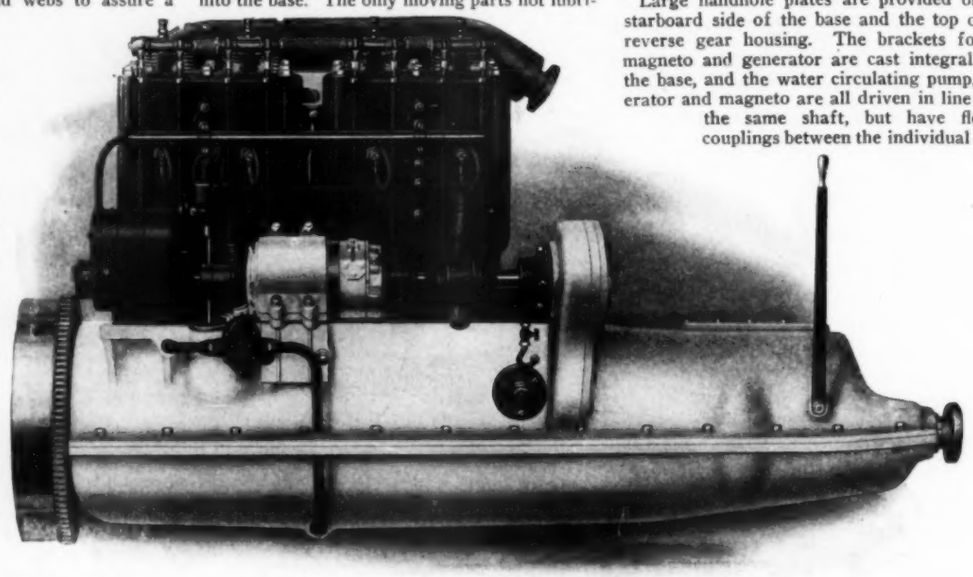
The cylinder heads are removable and carry the valves, rocker arms and brackets and valve springs. The valves seat directly against the head, doing away with valve cages and the difficulty of keeping them tight. The entire lower surface of the cylinder head is machined, making easy work of removing any carbon that may collect there. The joint between the cylinders and the head is made tight with a copper-asbestos gasket made up with thimbles around the water passages and cylinder bore.

A drop-forged crankshaft of ample proportions, with all bearing surfaces ground, and drilled for oil ways, is provided with a flange at the forward end for attaching the flywheel. The driving forces are carried between the wheel and the flange by six steel thimbles around the bolts. The camshaft is also a drop forging with the cams and gear integral, and all working surfaces ground. Three spiral cut gears are used for the camshaft drive.

All bearings, including the reverse gear and thrust bearing, are lubricated by one pump of the gear type, taking the oil from the base and distributing it through a header tube cast into the base. The only moving parts not lubricated by this system are the valve rocker arms. The oil is delivered from the pump at a pressure of 35 or 40 pounds. The pressure is controlled by a spring loaded valve that by-passes any excess oil.

For ignition there is provided a high tension magneto and a non-vibrating coil battery system with distributor. A two-unit six-volt starting and generating system is provided with the generator driven from the end of the water pump shaft. The starting motor pinion engages with teeth cut on the flywheel.

Large handhole plates are provided on the starboard side of the base and the top of the reverse gear housing. The brackets for the magneto and generator are cast integral with the base, and the water circulating pump, generator and magneto are all driven in line from the same shaft, but have flexible couplings between the individual units.



Port side of the new Knox motor, showing the valve-in-head construction, the pressure oil pump, magneto, generator and water circulating pump

The New Van Blerck Eight

WITH the ever-increasing demand for high-power high-speed marine motors for runabouts and express cruisers the Van Blerck Motor Company have just put on the market their new model M motor in four, six and eight-cylinder sizes. This new model supersedes those formerly produced by this company.

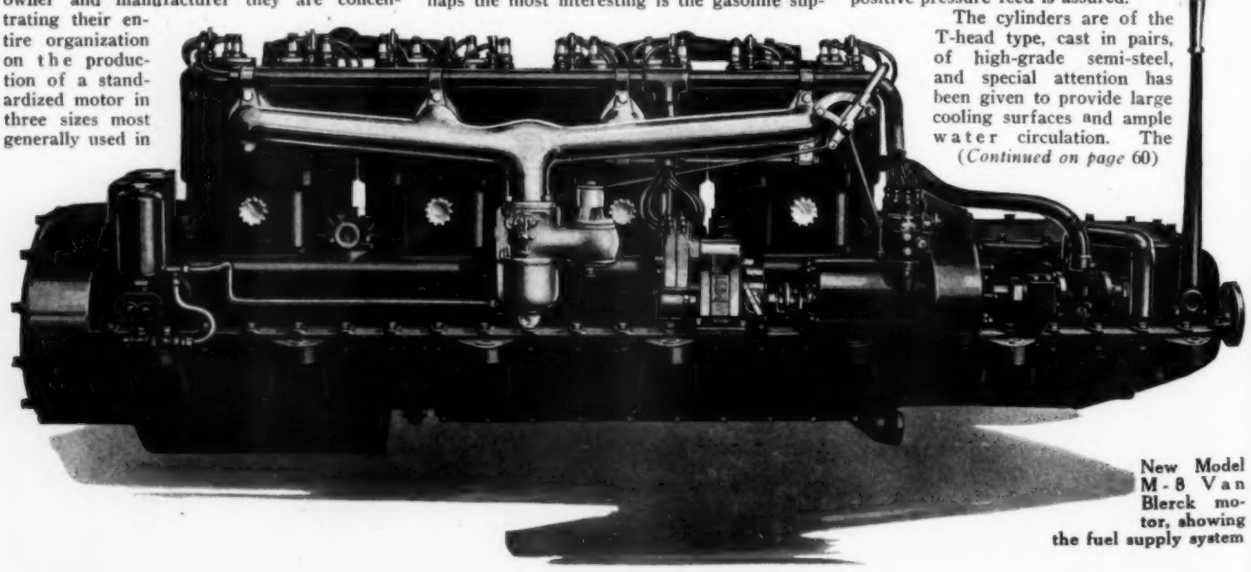
Realizing the advantages to both the motor owner and manufacturer they are concentrating their entire organization on the production of a standardized motor in three sizes most generally used in fast boats. These three motors are identical in all respects except the number of cylinders.

These motors have a bore of 5¾ inches and a stroke of 6 inches and are designed for normal operation at speeds from 1,000 to 1,500 r.p.m. The moving parts are carefully balanced, reducing vibration to a minimum.

A number of unique features are incorporated in the design of these motors, but perhaps the most interesting is the gasoline supply system. The fuel is drawn from the tanks by a gear pump discharging into a small pressure tank mounted on the base behind the flywheel, and from the tank to the carbureter. There is a spring-controlled relief valve on the line to the carbureter, so that when the pressure reaches a pre-determined point the gasoline from the tank is by-passed back to the suction side of the pump. In this way a positive pressure feed is assured.

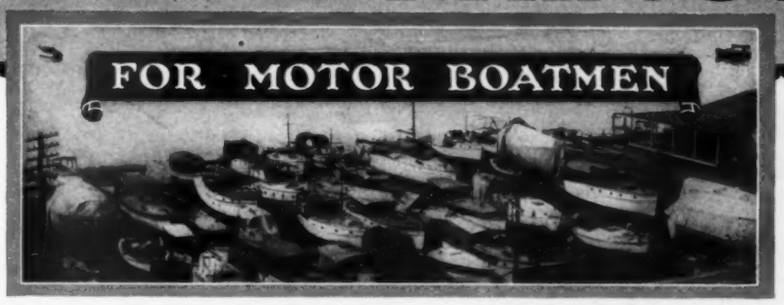
The cylinders are of the T-head type, cast in pairs, of high-grade semi-steel, and special attention has been given to provide large cooling surfaces and ample water circulation. The

(*Continued on page* 60)

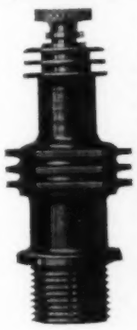


New Model M-8 Van Blerck motor, showing the fuel supply system

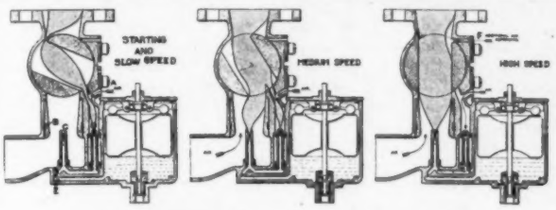
NEW THINGS



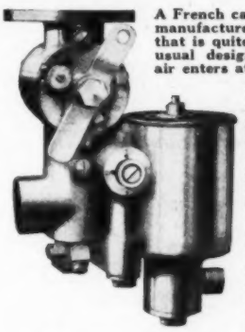
[Each month many new parts, attachments and fittings, interesting and invaluable to owners of large and small motor boats, are added to the devices already on the market. Announcements of these articles come to us in such numbers that in order to introduce all of them to our readers we have been obliged to omit descriptions and publish only illustrations with short explanatory captions. In doing this, however, we urgently invite our readers to write us for complete information, as we shall take the greatest pleasure in providing it, together with the manufacturers' names and addresses. Do not hesitate to ask us, as we have made special arrangements to take care of this branch of our correspondence and are able to give you accurate information with the greatest promptness.]



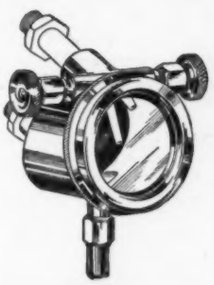
Have you had trouble with spark plugs overheating and causing preignition or being blown out by excessive pressure? Here is a spark plug especially designed for high-speed high-compression motors. The steel shell and the brass cap at the top of the mica core are provided with radiation flanges to avoid high temperature and preignition



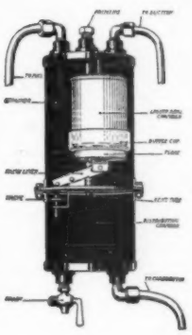
Why does the engine miss? This spark plug has an auxiliary spark gap 1/32 inch wide under the glass lens in the cap which shows very clearly whether the trouble is in the ignition system. This plug is substantially constructed and by the use of a lens over the auxiliary gap shows very plainly whether the plug is firing



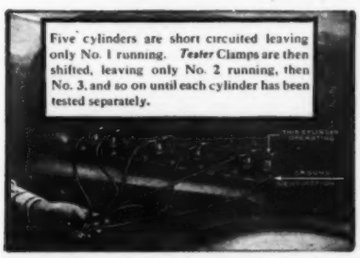
A French carbureter now being manufactured in this country that is quite different from the usual design. At slow speed air enters at A and mixes with the gasoline from the nozzle D, but as the throttle is opened the air draws the gasoline from nozzles C and D. When operating at full open throttle the auxiliary air intake A allows air to go down past nozzle D and come up through nozzle C along with the gasoline. There are no needle valves and only one adjustment—an air valve



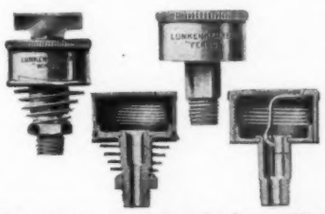
It seems impossible to keep some motors free from carbon troubles. This condition can be improved by supplying the motor with a small quantity of water vapor. The device shown is the sight feed and regulating valves used for feeding the water to a vapor system



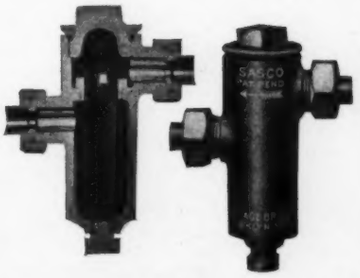
A vacuum system that has but one valve, and in which all the mechanism is accessible. The design of the liquid seal chamber, which controls the float action, and, in turn, the valve is such that its action is independent of the degree of buoyancy of the float. The tank, or outer shell, can easily be taken apart at the diaphragm thus exposing all the working parts


Five cylinders are short circuited leaving only No. 1 running. *Tester* Clamps are then shifted, leaving only No. 2 running, then No. 3, and so on until each cylinder has been tested separately.

Those who have tried to find which cylinder was not working properly in a multiple cylinder motor will appreciate this device. It is made for motors with from four to twelve cylinders and is extremely simple to use. The method of using this device is outlined in the illustration

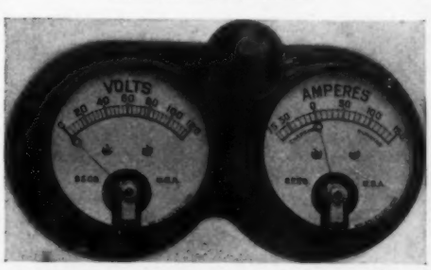


These grease cups are only four patterns selected from a complete line of cups now made of steel. They may be obtained in various sizes, with or without locking devices. With the present high price and uncertain delivery of brass goods these substantial steel cups should prove much more satisfactory than the cheap, flimsy stamped brass cups now on the market



Almost every motor boatman has at some time experienced difficulties from dirt clogging the carbureter or gasoline line. Here is a gasoline filter of small size but of heavy construction. The gauze strainer is in the form of a cylinder soldered to a bronze collar, which screws into the body of the strainer and is easily removable for cleaning

A clock that will not run down. This self-winding electric clock will run for a whole year on one set of dry batteries on the six-volt lighting circuit in the boat



A self-contained volt-ammeter with instrument lamp that will simplify the wiring. It can be supplied with scales graduated for various ranges up to 150 volts and for any amperage desired. It is arranged for either concealed wiring or with lugs for panel mounting and exposed wiring

For those who have trouble with oil or carbon on the spark plugs of their motors and who do not care to use water vapor in the engine, this device should prove a great help. It can be applied to any spark plug and will protect the electrodes from oil and carbon

Do not fail to write to the editor if you desire information concerning any of the above new things

Smoothing the Bumps

More Worthy Hints and Suggestions for the Beginner—Of Interest Also to the Old Salt

In Four Parts, Beginning in the February Issue

CHAPTER II

PROBABLY at a first glance the working drawings for the construction of a boat appear to be a hopeless maze of curves and other foolish lines, and an unnecessarily large amount of them at that. While quite a number of lines are really necessary very little study will serve to show that the combination is comparatively simple. The "lines" is that drawing which shows the form or shape of the outside of the completed hull. In all probability you have at some time or another seen a wooden model of a boat such as was invariably used by the old-time builders in determining the proportion of the proposed boat. These models are made of layers of wood, fastened together with wooden plugs, whittled and worked to the desired shape to suit the "eye" and ideas of the builder. The modern designer works out the shape of the hull on paper. He, too, relies principally upon his "eye," but of course his work is a great deal more exact, as he can not only see the actual shape of the boat in the lines, but he can also make all the necessary calculations to prove up his work as he goes along. But the finished jobs are much the same. The model is made in layers which, when taken apart, show exactly the shape of the boat at that line. These lines are called "layer" or "lift lines," and correspond to the "waterlines" in the drawing, excepting that the layer lines are generally made parallel to the keel and the waterlines are presumably level. The hull, too, is drawn in such position as it is calculated to float when completed. Therefore all the horizontal lines in the drawings, passing through the hull itself are called waterlines and the one showing the surface of the water is marked L. W. L. or load waterline. The hull is divided vertically into sections, generally called stations, during construction. These stations or section lines are numbered, and the lines correspondingly numbered in the body plan show the shape of the boat cut through at these sections.

The sheer plan shows the outline of the sheer, or deck line, the keel line, and rabbet line, giving in fact the profiles of the hull and the "buttock" lines. These buttock lines, generally about two or three in number, show the shape of the hull cut into layers parallel to the center lines, these lines being principally used by the designer as "fairing" lines in order to check the others that there be no lumpiness in the completed boat. The rabbet line shows the point at which the planking joins the keel and stem, and of course merges into the keel line, if the construction is such that the keel does not show outside of the planking. The "diagonals" are simply fairing lines, and are run in at as nearly right angles to the section lines as possible, so that the measurements can be accurately made; as, for instance, in a very flat section, if we measure the distance from the center line to the intersection of a waterline, the measurement is likely to be very inaccurate; whereas, if we measure along a diagonal, cutting it at a right angle, we can take the distance with absolute accuracy. Measurements along the diagonals are always taken from the point at which they intersect the center line. The base line is drawn parallel to the waterline, generally some distance in even feet or inches below it, and clear of the bottom of the keel. It is from this line that all measurements for heights are taken. In construction, it represents the floor, or a heavy straight timber to take the place of the floor line, which should be immovable and straight, to allow of accurate measurements being taken from it.

In the drawing only one-half of the boat is shown, since the other side is identical and the forward sections are drawn on one side of the center line and the aft sections on the other. The construction plans and sections show the shape of the members forming the hull and the method of fastening. A small amount of study will make them perfectly plain.

The cabin plans, of course, show the arrangement of space on deck and below. They represent in nearly all cases personal ideas, which are always subject to changes and alteration. Do not forget, when you tackle the proposition of rearranging a cabin plan, that the outside of the boat is a curving line all the time, and the outline shown in the cabin plan is generally the deck line, or point of greatest breadth. By carefully considering the breadth (by actual measurement from the body plan) at the different points, you will avoid the discovery after your plans are all worked ont that the berths are a foot wider than the hull, or that there is only six inches of space where you expected the floor to be two feet wide. The lines show the outside of the hull, and the cabin the inside, so there is the thickness of the planking, frames and ceiling to be allowed for in your calculations also. If you have your plans made by an architect they will in all probability be drawn to a scale of ¾ inch to the foot, and if you have to have them copied from a small drawing, have them worked from, as it is just one-sixteenth of the full size of the work. If you copy or have plans copied, don't forget that absolute accuracy is the keynote to success in yacht building, and is especially important in the drawings.

In the big shops the design is "laid down"—that is, the plan is reproduced on the floor of the mould loft full size, and all patterns are taken from these lines. These drawings are made upon the floor, for if they were made on paper the shrinking and swelling of such large sheets would be quite a serious matter. This also admits of a final fairing of the lines to eliminate the small inaccuracies which are bound to creep in, especially if the drawings are made to a small scale. In reproducing from a ⅜-inch scale drawing the work is magnified thirty-two times, which of course magnifies every minute error into considerable proportions. For the convenience of the builder and to eliminate errors, and for facility in checking the work, the architect works up what is called a "table of offsets." This is a table of carefully scaled measurements, giving the distances between the intersections of lines, breadths of the waterlines at stated sections, heights, etc.—in fact, every measurement necessary for reproducing the plans on the floor. These measurements are generally given in feet, inches, and eighths, thus 6.2.4 meaning six feet, two and one-half inches. It must be remembered that these lines and figures always represent the finished boat, or "to the outside of the plank," as the builders say.

In a small boat, where the lines are accurately drawn to, say, ¾-inch scale, it is not absolutely necessary that the entire set of lines be laid down full size. The shape of the stem, and different members of the deadwood, knees, etc., must be laid down full size, the shape or "moulding" of these parts being taken from the construction plan. If the keel is straight, of course that need not be laid out full size—only at the ends where it joins the stem and aft deadwood.

In order to make the moulds, showing the shape of the hull at the various stations, the body plan must be enlarged to full size. These sections will probably be shown on the drawing spaced 3 to 4 feet apart, and the sections should be taken at these points for making the moulds. Moulds spaced farther than 4 feet apart are not much use, and unless the lines are unusually important, or complicated, spacing them closer than 3 feet is a nuisance.

The body sections, and in fact the stem and other drawings, can be made on very heavy paper, keeping the paper in large sheets, so that it will not pull out of shape when being handled.

In laying off, these paper drawings can be laid on top of the wood, and the lines stuck through with an awl, the paper being preserved as a check when the work is to be put together.

The transom may be laid off directly on the wood, taking care that sufficient margin is allowed for the bevel, if the transom is raked.

Since the lines are drawn to the outside of the plank, this thickness must be deducted. Take a compass, set at a radius equal to the thickness of the planking, and with the point set on the lines of the body plan describe half circles at close intervals. The highest point of these semicircles will naturally show the line of the inside of the planking. It is these points which should be pricked through on to the wood for the moulds. Of course, the line of the outside of the rabbet should be marked on the stem and keel, as shown in the drawings.

The amateur generally receives one of the big shocks of the game, when he brings his lumber bill to the dealer and finds the price is almost twice what his friends have told him he should pay. Generally it is not the dealer's fault. Of course, nothing but the very best grade of lumber should be used in a boat. Exposed as it is to the severest atmospheric changes, sappy and defective lumber goes to the bad in short order, and it is extreme folly to put such stuff into a boat. The trouble in the lumber department is usually started in the way the list is made out. First, always put the stuff down as though you know the business, thus:—6 pcs. ⅞ inch by 12 inches—10 feet pine D. D., not 6 pcs. double dressed pine 10 feet long, 12 inches wide, ⅞ inch thick. The mill man knows right away, if you write it so, that you're not on the job. If you need some pieces 9 feet long, order them 10 feet, for you will be charged for the 10 feet, as the mills only cut in even lengths, and you may as well get the benefit of what you buy. Inquire of some builder or dealer as to the regular stock sizes in which the different kinds of lumber are carried in your vicinity, and be guided by these dimensions. Specially cut stuff always costs more money than the stock material, and you will in all probability get a better grade, as there is a larger quantity to pick from.

In figuring out your list, try to get in everything you can think of in one bill, and make sufficient allowance for waste. Often in trying to skin the quantities down too close you will run short, and buying material like lumber in small bunches is simply burning up money. Better have a couple of feet left over than not enough. It comes cheaper in the end, and saves worry.

We cannot advise you too strongly to beware of kiln-dried lumber of any sort for boat work. The kiln just simply dries the lumber too quickly, takes away the life and elasticity, leaving it hard and brittle. Only air-dried stuff should be used, and care should be taken to see that the planking material is dry. If it is possible to order your material a few months ahead of the time you are to use it, by all means do so, and have the planking material stacked up under cover, where it can get plenty of air. If the boards are stood on end the drying process will be greatly facilitated, and you will then be quite sure of your material being fit to use.

(*To be continued*)

AiR BoatinG

This department is established for the purpose of bringing to the attention of our readers all the important developments in aviation. Our efforts seem to have met with immediate approval. The lovers of the great new air sport and industry are largely drawn from the devotees of the greatest of water sports.

The invincibility of the airplane is established. High development of the engine has conquered the gale. The makers are now planning after-war development of flying. The lure of the air calls to another field of romance and adventure.

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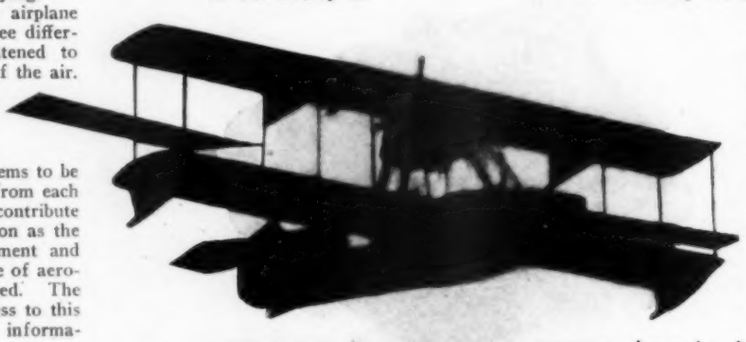
Safety in the Air

A Few of the Problems Which Had to Be Successfully Solved in the Operation of the Modern Aircraft

By W. S. Archibald

THE airplane was born into a scientific world, and almost every science known to man has contributed something to the efficiency and safety of flying.

The necessity of the airplane maintaining poise on three different axes at first threatened to complicate the mastery of the air. But many of the brightest minds in the different departments of scientific research concentrated upon the problems to be solved, and by drawing from each science what it could contribute and using this information as the basis of further experiment and research, the new science of aerodynamics was established. The birdman to-day has access to this great mass of scientific information.



Fortunately for the aviator, the engine manufacturers of America had already brought the internal combustion engine to a high degree of development, for the engine is three-fourths of the airplane.

Work in developing the engine has kept pace with the development of the science of flight, and to-day there is safety in the air because reliable motors are used by pilots with the necessary knowledge.

As scientific men with engineering training have concentrated upon the problems to be solved and the difficulties and dangers of flight, it is natural that inventive genius has equipped the airplane with apparatus to render flight both easier and less hazardous.

It has remained for the greatest war in history to inspire that development of both engine and plane which makes it really safe to fly.

A mechanism known as the air speed indicator has been invented to show the airplane's rate of speed relative to the air. Owing to velocity of wind this may often differ from the rate the machine travels over the earth.

The ground velocity is estimated by adding the wind velocity to or subtracting it from the air speed, taking into consideration the angle of the wind to the machine.

The anemometer is used now only to determine the force of wind at the earth's surface. This instrument ceased being taken aloft as more accurate instruments were developed.

We illustrate an instrument known as the angle of incidence indicator, equipped with electric contacts. This indicates the position of best climb or dive, and enables the aviator to get the best climbing and gliding angle out of his machine.

It warns by a red light when the aviator climbs at a dangerous angle, and by a white light when he dives at too steep an angle. A green light indicates the best climbing angle.

The signals are regulated by a vane operated by the air stream.

This instrument is very valuable, especially at night.

There are also mechanical types of directly operated indicators.

A banking indicator enables the aviator to maintain his machine in a proper lateral position. The end view of the airplane frame seen on the dial maintains the same angle to the lateral line shown on the dial as the machine does to the ground.

As it indicates deviation from the proper position, it enables the pilot to prevent slides, slipping and skidding,—over-banking and under-banking.

The instrument shown operates on the pendulum principle, controlled by centrifugal force as do all banking indicators. This is one of the most efficient.

The degree to which it is necessary or safe to bank in turning varies with the velocity and weight of the machine, the area of its surface and the radius of the circle.

Banking is, of course, necessary in turning, but proper at no other time.

We illustrate a synchronized drift set which enables the aviator to correct for both velocity and direction of all air currents without making mathematical calculations.

This is done by turning the drift indicator, consisting of a specially designed telescope mounted to point vertically downward, until the hairs crossing the field of vision are parallel with the line of flight. A pointer indicates on a scale the angle of drift in degrees; and at the same time the compass lubber line is moved automatically by means of enclosed cable the exact amount in the right direction to correct for any existing drift. This instrument is used on Government airplanes.

Our old friend the compass is all dressed up in a new suit of radium, so he can be useful on the darkest night when it would be unsafe to use illuminating light. This is used, of course, as on our motor boat, to show the direction the machine is heading. An accurate and durable compass not susceptible to vibration is a necessary part of every aeroplane equipment.

The altimeter, which accurately registers the airplane's altitude, is made possible by the fact that as height is attained the pressure of the atmosphere decreases.

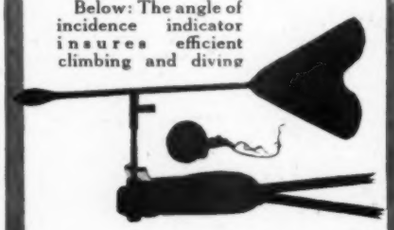
The elementary principle consists of a small

Above we see the pilot demonstrating his confidence in the Sperry automatic pilot, as well as the ability of the automatic pilot to maintain the equilibrium of the airplane. Below, on the same machine after it has come to rest upon the surface of the water, may be seen just how the automatic pilot is mounted.

Many government planes are now equipped with this device, which is the most ambitious aid to the pilot yet attempted. As it maintains the equilibrium of the machine, it will doubtless prove of great military value, by enabling the pilot to devote more time to the duties incident to reconnaissance, combat or bombing.

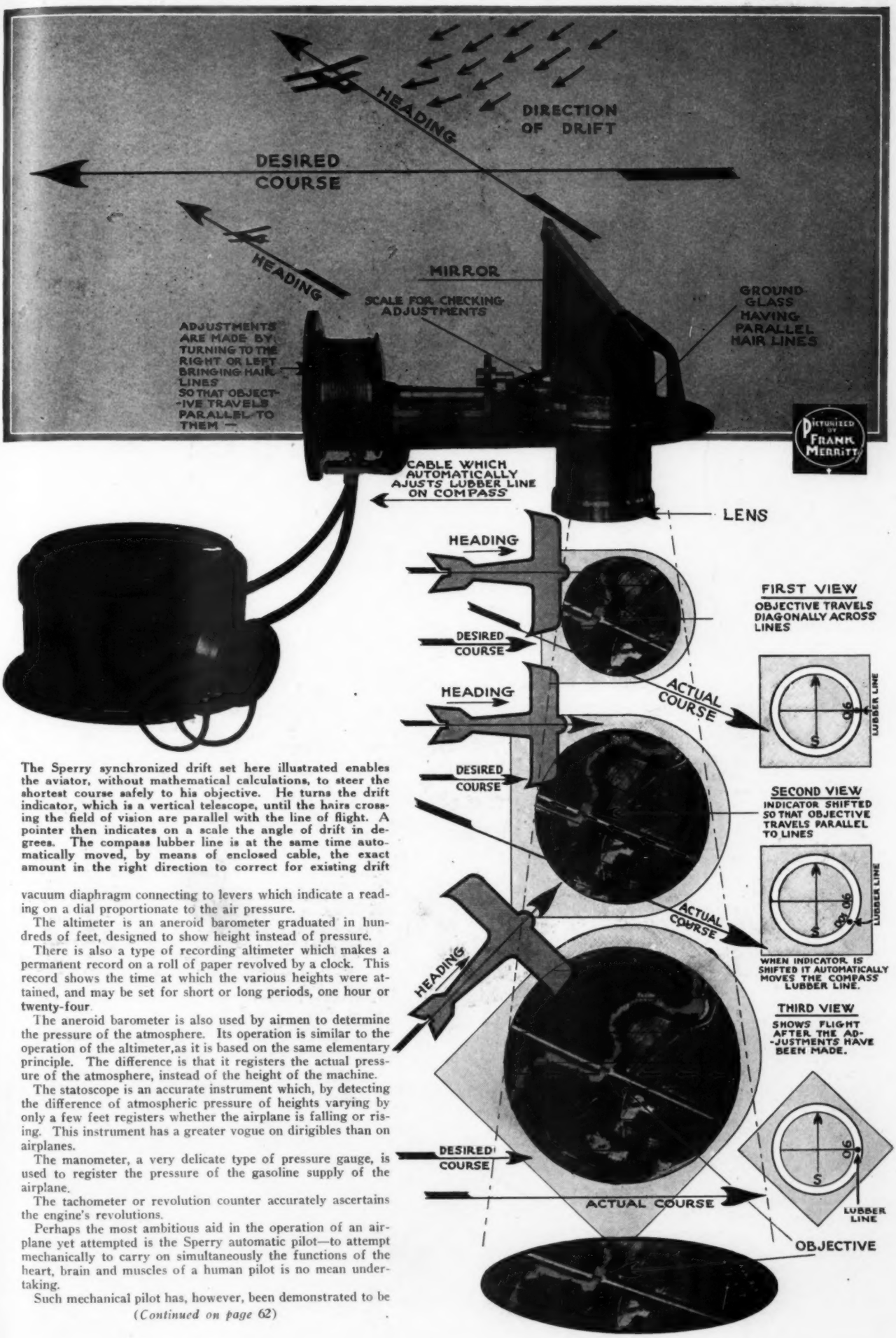
This mechanism is so efficient that on at least one occasion a landing has been made without the aid of the human pilot.

Below: The angle of incidence indicator insures efficient climbing and diving



This mechanism keeps the pilot informed of his rate of speed

The Banking Indicator enables the pilot to avoid slides, slipping and skidding.



The Sperry synchronized drift set here illustrated enables the aviator, without mathematical calculations, to steer the shortest course safely to his objective. He turns the drift indicator, which is a vertical telescope, until the hairs crossing the field of vision are parallel with the line of flight. A pointer then indicates on a scale the angle of drift in degrees. The compass lubber line is at the same time automatically moved, by means of enclosed cable, the exact amount in the right direction to correct for existing drift

vacuum diaphragm connecting to levers which indicate a reading on a dial proportionate to the air pressure.

The altimeter is an aneroid barometer graduated in hundreds of feet, designed to show height instead of pressure.

There is also a type of recording altimeter which makes a permanent record on a roll of paper revolved by a clock. This record shows the time at which the various heights were attained, and may be set for short or long periods, one hour or twenty-four.

The aneroid barometer is also used by airmen to determine the pressure of the atmosphere. Its operation is similar to the operation of the altimeter,as it is based on the same elementary principle. The difference is that it registers the actual pressure of the atmosphere, instead of the height of the machine.

The statoscope is an accurate instrument which, by detecting the difference of atmospheric pressure of heights varying by only a few feet registers whether the airplane is falling or rising. This instrument has a greater vogue on dirigibles than on airplanes.

The manometer, a very delicate type of pressure gauge, is used to register the pressure of the gasoline supply of the airplane.

The tachometer or revolution counter accurately ascertains the engine's revolutions.

Perhaps the most ambitious aid in the operation of an airplane yet attempted is the Sperry automatic pilot—to attempt mechanically to carry on simultaneously the functions of the heart, brain and muscles of a human pilot is no mean undertaking.

Such mechanical pilot has, however, been demonstrated to be

(*Continued on page* 62)

Sea Birds and Airplanes

By F. M. Weston, Jr.

ADDED to the many dangers that beset the air pilot is the ever-present possibility of collision with the native navigators of the air. While few birds will allow a man or a boat to approach to within a reasonable distance, it is interesting to note how little attention some sea birds pay to an airplane.

At the Navy Aeronautic Station, Pensacola, Fla., there are several species of birds which are very abundant on the Bay during the winter months.

Of these, the great pelicans notice an airplane not at all, and it requires continual watchfulness on the part of the aviators, when flying near the water, to avert a catastrophe.

Sea gulls can generally be depended upon to keep out of the way, especially when the machine is running along the surface of the water.

Ducks are perhaps the most wary of all, but even they can be approached to within gunshot range without difficulty—some of the more daring pilots frequently enjoy duck shooting from a machine.

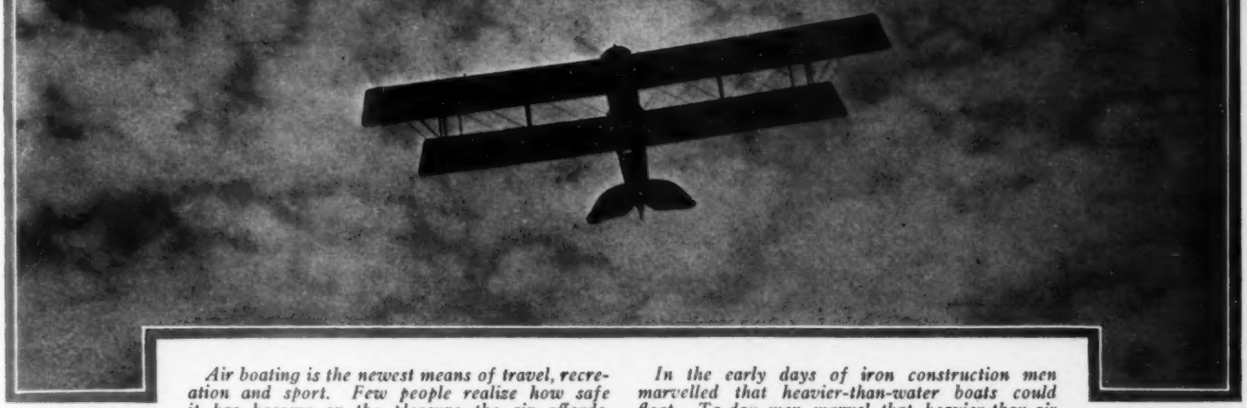
A bird seems a small thing to cause the wreck of an airplane, but we must take into consideration not only the weight of the bird but also the speed with which it may strike the 'plane—it is not uncommon for ducks to break the heavy glasses surrounding the lanterns of lighthouses.

The photographs show a herring gull which was not quick enough to get out of the way and met its death when it was struck by the wire bracing. Note the large size of the bird as held up by the two men, the spread of the wings from tip to tip being more than 48 inches. The herring gulls are strong and buoyant fliers, spending much of the time on the wing and are voracious feeders upon fish or any animal substances which they can find in the water. Fortunately for the pilot the machine was about to make a landing and was traveling at a comparatively slow speed at the time of the accident. As it happened, there was no damage done, but, had one of the wires given away under the force of the blow, there would have been a very different tale to tell.

In collision with an airplane

One of the chief dangers which beset the flier is the possibility of colliding with large birds. The force of collision is generally so great that something has to let go

ANSWERS



Air boating is the newest means of travel, recreation and sport. Few people realize how safe it has become or the pleasure the air affords. Many still think of air boating as a violation of the law of gravity and therefore "Tempting Providence." Some approve it—for others, but will have none of it themselves. Still others, satisfied that it is safe, take only a casual interest for lack of definite information.

We believe that air boating should and soon will be as popular as motor boating is to-day. Many who now for the first time take any serious interest in the air will float upon and glide through it with as much satisfaction and perfect security as speeding over the water.

In the early days of iron construction men marvelled that heavier-than-water boats could float. To-day men marvel that heavier-than-air craft can perform the feats of the modern airplane. The wonder is followed by a lively interest and men come to ask questions, and that is the reason for this department.

Perhaps there is no subject upon which the public has so little information. This is unfortunate and we hope to be of real service to our readers. We hope they will ask many questions, and we assure them that we will in each instance endeavor to give them an accurate and satisfactory answer.

QUESTION: (a) How large a field is necessary to insure safety to an airplane in starting flight or in alighting after a flight? (b) Must the field be a dead level or would a gentle roll be satisfactory? (c) Is it safe to rise from or land upon the top of the hangar? I understand seaplanes are launched from battleships.

ANSWER: (a) The field should not be less than 250 feet wide and from 600 to 1,000 feet long. A more nearly ideal field would be about 750 to 1,000 feet square. (b) A gently rolling field would be satisfactory—that is, provided there is not too much roll to the ground, and that aside from the roll the terrain is perfectly smooth, showing no boulders. If you can send us a photograph of the field, the writer will be glad to advise further. (c) It is not practicable to start an airplane from the roof of your hangar. It is true that seaplanes are successfully launched from battleships. This is accomplished only by means of a piston 20 feet long, which must travel, to launch the seaplane, at the rate of 40 miles per hour. This requires about 800 pounds of air pressure and you can readily see such a system would not be practicable on the hangar. In 1911 Silas Christofferson flew from the roof of the Multnomah Hotel, Portland, Ore. He started from a long platform and just managed to make the start. He would not take the same hazard again. About 1912 or 1913 Eugene Ely landed on a specially constructed platform on the deck of U. S. S. Pennsylvania. This was purely experimental and has not been repeated.

* * *

QUESTION: What type of machine is usually best for a beginner to buy? What make do you recommend?

ANSWER: A two-place tractor biplane of not less than 90 or 100 h. p. We would suggest that the prospective purchaser examine carefully into the merits of the different machines before purchasing any. It is just as necessary to make a careful selection of a plane as of a motor boat or automobile, and as soon as the war demand ceases, or slows down, the prospective aviator will have a very fair range of selection. Another important item which must be thought of at the very start is your air boathouse. As soon as you have decided upon your plane you will want to construct your hangar, and you must have it completed before you get your airplane or seaplane.

* * *

QUESTION: Just exactly how dangerous is it to learn to fly? Out of 100 flights, how many chances has a beginner to have a fatal accident? Can you give me any actual figures of real performances at any particular training station? (b) After one really knows how, to what extent are his chances improved?

ANSWER: (a) It is always hard to give percentages applicable to any science or sport so new as aviation. No matter how safe the art of flying may become there will always be some casualties, just as men and women give their lives every day in the more commonplace occupations. We believe that flying by a careful pilot already is safer than many occupations. And we look for far, far fewer accidents than in the automobile racing sport. We appreciate your desire to have exact information and will cite the actual experience of one of our naval air training stations "somewhere in America." From April to December the time flown by students aggregated 150 hours in the air per week, or a weekly total of 11,000 miles. During the thirty-nine weeks' flying there were 5,850 hours when a machine was actually in the air covering a distance of 429,000 miles, or a distance equal to seventeen times around the world at the equator. This included a great deal of trick flying. There was one fatality, which, naturally enough, was due to carelessness. A student failed to strap himself in, and when his machine side-slipped in looping the loop he fell out and to the ground. Had he been properly tied in, following instructions, when his plane side-slipped he could not have fallen and there is every reason to believe the plane would have righted itself as such a plane usually does, and there would have been no fatality.

The elements of human weakness make for accidents in the air as on the earth or upon the surface of the water. And it is not hoped that the airplane will ever be quite fool-proof. (b) After one really "knows how" his risk, of course, is lessened. We have been told that the experienced pilot's chances of serious accident are something less than one thousandth of one per cent. We believe that it is too early to give any very accurate figures on this subject.

* * *

QUESTION: Is it necessary for safety's sake that the pilot while flying always keep his hand on the control?

ANSWER: Some experienced flyers are able to keep their machines going for several minutes at a time without having their hands upon the controls. And devices are made which are claimed to enable the pilot to even leave his seat for five minutes or even eight minutes at a time. In most of the trick flying we have seen, however, we believe the pilot has used his knee when his hand was removed from the control. And no beginner will ever take his hand off his control with our approval.

* * *

QUESTION: (a) What is the prospect for cross country flight in America? (b) Has there ever before been a demand for airplanes?

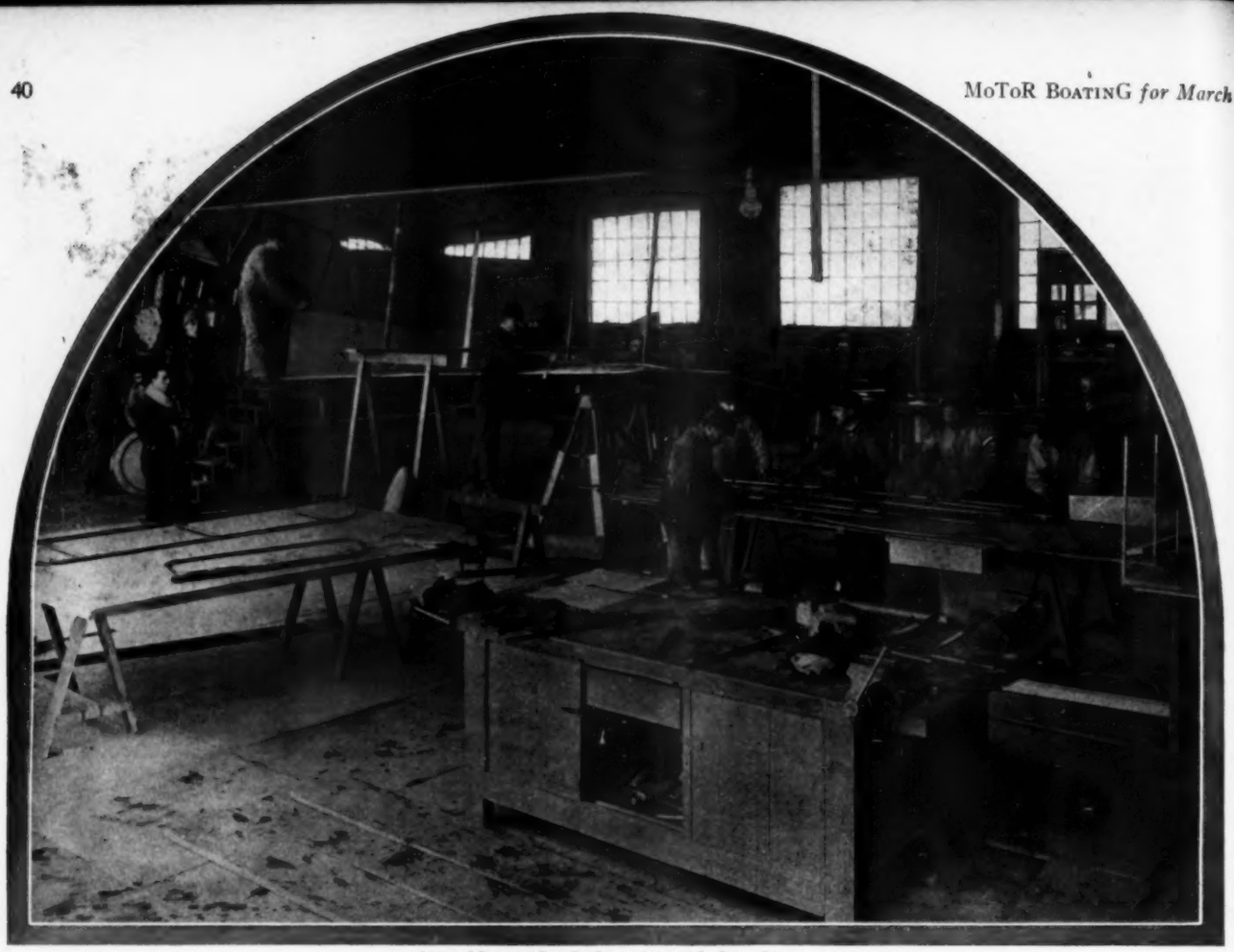
ANSWER: (a) The prospect for cross country flying in our country is very bright. The inability to get machines on account of the Government's need is, of course, holding back flying by private owners and nearly all who already knew how to fly have joined the Government's aviation forces. However, the impetus given to the art and science of flying by war development far outweighs the temporary disadvantage of the monopoly of the market. (b) Yes. There was a demand for airplanes, mostly for exhibition purposes, about 1911, after Curtiss flew from Albany to New York above the Hudson River, but the public interest lagged and the demand finally died out. At present there is a private demand which cannot be filled on account of a more important public need.

* * *

QUESTION: Just what is meant by the safety factor of an airplane?

ANSWER: Briefly, the factor of safety may be said to be the amount of overload, above normal, the machine will stand. For instance, let us suppose the normal load of the wings to be about five pounds to the square foot. If the factor of safety were six, the wings would stand a strain of thirty pounds per square foot of surface. A factor of safety of nine would be forty-five pounds per square foot of surface.

The various parts of the plane are usually designed for the stresses induced by normal flight with a predetermined factor of safety. It can readily be seen that the factor of safety is just exactly what its name implies. A recent army specification for hydro-aeroplanes demands a factor of seven for materials subject to deterioration and six for other materials. The average factor of safety in aircraft design is about six, but this has depended somewhat on the type of the machine and has in fact ranged from five to fourteen for the individual parts.



Assembling a battleplane in an Italian factory

The Relation of the Motor Boat and Aircraft Industries

How the Work of the Two Industries is Very Similar—The Motor Boat Builder's Training Will Permit Him to Enter This New Field

By Henry Woodhouse

THE Army has asked for $1,032,000,000 for military aeronautics and the Navy for close to $100,000,000 for naval aeronautics. A further extension of the Naval Air Service, approved by Secretary Daniels, provides for the training and equipping of 10,000 naval aviators. To do so will take an average of not less than one aeroplane to train each aviator and six seaplanes to keep each aviator on the fighting fronts for a year.

At the recent Senate hearings Colonel E. A. Deeds, member of the Aircraft Board, stated that the scarcity of skilled labor was the one most serious problem which has caused a delay of one month in carrying out the huge aircraft program.

Builders of pleasure boats and marine engine manufacturers, whose business has decreased on account of the war, can help to solve the problem, employing their trained workmen and machinery to make parts for aeroplanes and aero motors.

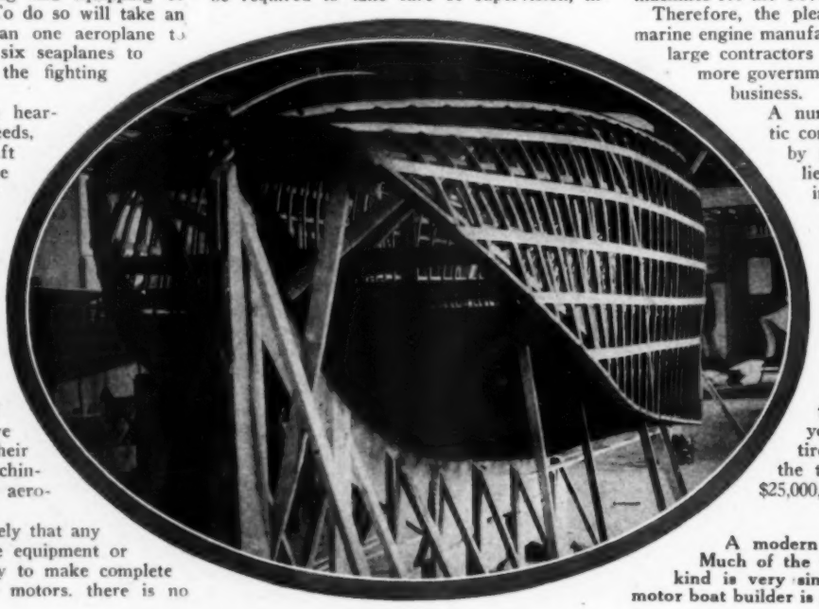
While it is very unlikely that any of these firms have the equipment or the knowledge necessary to make complete aeroplanes or complete motors, there is no doubt that they can manufacture aeroplane and motor parts.

Members of the Aircraft Board stated recently that the Government has not the organization and technical personnel that would be required to take care of supervision, inspection and accounts in small factories. Therefore, the Aircraft Board's policy is to give orders to large established concerns only, with the exception of some few small aeronautic firms that are building experimental machines for the Government.

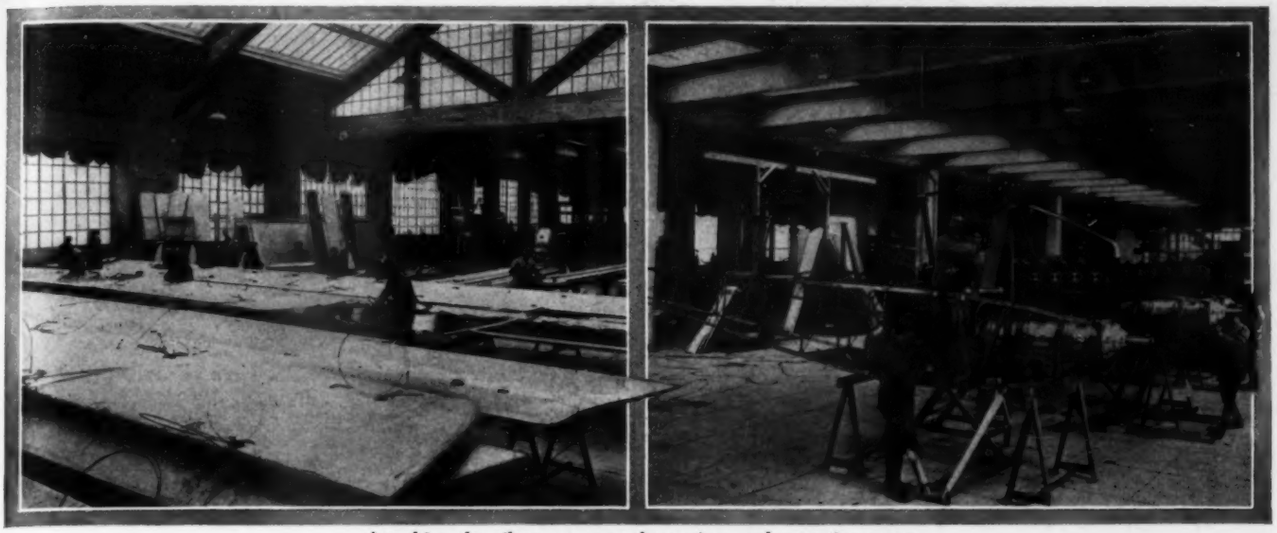
Therefore, the pleasure boat builders and marine engine manufacturers must look to the large contractors who have, and can get more governmental contracts, for their business.

A number of these aeronautic contractors get parts made by smaller factories of allied industries. There are in all about seventy contractors and four hundred sub-contractors, making the aircraft and aero motors for the Army and Navy at present.

Not more than twenty of the contractors and fifty of the sub-contractors were in the aeronautic business a year ago, because the entire aeronautic business at the time did not amount to $25,000,000.



A modern flying boat in frame. Much of the work on a boat of this kind is very similar to that which the motor boat builder is accustomed



Attaching the ailerons to aeroplane wings and mounting motors

While to build whole aeroplanes and aero motors requires special knowledge and facilities, almost any wood-working factory, properly supervised, can make the wooden parts of aeroplanes. Many of the motor parts and the aeroplane metal parts can be made by marine engine manufacturers.

AERONAUTIC MOVEMENT WELCOMES ASSISTANCE AND PAYS LIBERALLY

The aeronautic movement is quick in grasping manufacturing facilities and to welcome the assistance of manufacturers from allied industries. And it pays most liberally for assistance rendered. I have seen a number of firms get large orders for aeronautic business practically overnight. They either had something that we needed in the aeronautic movement, or were able to assist production or solve some mechanical problem.

I recently gave a letter of introduction to the head of a large concern that manufactures a product that was not used in aeroplane construction. He thought he would find a use for his product in aeroplane construction and I introduced him to a large aeroplane manufacturer. To-day he has hundreds of thousands of dollars worth of aeronautic business. This is only one of many such instances.

Seasoned lumber, machinery, tools and trained workmen are valuable assets to the aeronautic movement, and firms that have such assets will have little trouble in getting business.

Statement by Henry R. Sutphen at the Annual Meeting of the National Association of Engine and Boat Manufacturers

The war has changed all our affairs very greatly, and I know that many of our members have followed other lines of work outside of their established boat and engine building. No doubt in the future we will be called upon to take up new lines of work which the Government will expect us to carry out, particularly the aeroplane development of the flying boat, which I think more and more we will be called upon to furnish. That means a new line of work to many of us, although it is right in the line for the boat builder, that he has been accustomed to following in the past. By means of standardization, I think we can accomplish a great deal in that new line of work that the Government will call upon us to furnish.

Here is the official list of materials necessary for a single training type aeroplane of the more simple type, exclusive of all the materials necessary for the engine:

Nails, 4,326; screws, 3,337; steel stampings, 921; forgings, 798; turnbuckles, 276; veneer, 57 square feet; wire, 3,262 feet; varnish, 11 gallons; dope, 59 gallons; aluminum, 65 pounds; rubber, 34 feet; linen or cotton, 201 square yards; spruce and fir, 244 feet; pine, 58 feet; ash, 31 feet, and hickory, 1½ feet.

This represents the smallest and simplest type of aeroplane. Other types go up in size to over 100 feet span, and have two or more motors. Then there are the hydroaeroplanes with single or double pontoons and flying boats with a single boat-shaped hull, which is over forty feet in length in large flying boats.

Boat builders have proven themselves adept at making boat hulls and pontoons, also at making wood parts for aeroplanes. Under proper supervision, they can, no doubt, manufacture most of the aeroplane parts.

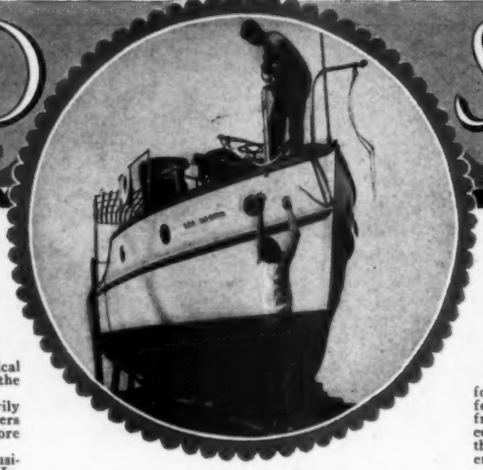
WONDERFUL PROSPECTS OF PERMANENT BUSINESS IN AERONAUTICS

The fact that the aeronautic field promises to have extensive business after the war makes the aeronautic additionally attractive.

As has already been stated repeatedly in MoToR BoatinG, there will be tens of thousands of large aeroplanes in every day use.

"Doping" and varnishing sections of aeroplane wings

YARD AND SHOP



Free Admission to Show for Men in Uniform Due to MoToR BoatinG

It was through MoToR BoatinG's efforts that the men in the uniform of the Navy and Army were granted free admission to the Fourteenth Annual Motor Boat Show.

MoToR BoatinG realized that the Show offered a splendid opportunity for men in the service of the Naval Coast Defense Reserve to obtain practical information from the manufacturers in the field of the motor boating industry.

Many of the more ambitious men had voluntarily sought from some of the marine engine manufacturers information that would help them to become more efficient.

Consequently E. C. Wright, MoToR BoatinG's business manager, wrote to Secretary of the Navy Josephus Daniels at Washington calling this to his attention and asking if it would be possible to permit a number of men from Brooklyn, Newport and Philadelphia to attend the Show, or, if they might only attend on regular leave, if a notice from the Department could be issued calling attention to this exhibition.

It had been suggested to the Show Committee by MoToR BoatinG that men in the uniforms of the Navy and Army be admitted free.

The letter in response to Mr. Wright's communication, from Lieutenant Commander T. H. Newberry, is given below together with MoToR BoatinG's answer:

January 3, 1918.

Mr. E. C. Wright,
Business Manager, MoToR BoatinG,
119 West 40th St., New York City.

Sir: Your letter of December 20th, addressed to the Secretary of the Navy, has been forwarded to the Commandant, Third Naval District. It is noted that in the third paragraph of your letter you state as follows:

"It has been suggested to the Show Committee that men in the uniform of the Navy be admitted free."

Information is requested as to whether or not it has been decided to admit officers and men to the Motor Boat Show free of charge. If so, a circular letter will be sent out immediately to all ships and stations giving this information.

This letter is being sent by special messenger, who will wait for reply if convenient to inform this office at once.

By direction of the Commandant.

Yours respectfully,
T. H. Newberry,
Lieut. Comdr., F.N.R.-Aide.

January 3, 1918.

T. H. Newberry, Lieutenant Commander,
Fleet Naval Reserve, Third District,
280 Broadway, New York City.

Dear Sir: Replying to your communication of today requesting information as to whether it has been decided to admit officers and men in uniform to the Motor Boat Show free of charge, I have been instructed to inform you that the show management will admit all men connected with the United States Navy or the United States Naval Reserve Force to the Motor Boat Show without charge.

As you may be aware the Motor Boat Show will be held in the Grand Central Palace, Lexington Avenue and Forty-sixth Street, New York City, from January 19 to 26 inclusive. The show will open at 2 P. M. on the nineteenth and will remain open from 10 A. M. to 10:30 P. M. on the following days, Sunday excepted.

Yours very truly,
MoToR BoatinG,
C. F. Chapman, Editor.

Those who attended the Show will remember with what avidity the men in uniform sought information. All day long, hundreds of them could be seen clambering in and out of the cabins of the cruisers on display, eagerly inspecting engines and accessories and crowding about MoToR BoatinG's booth and the moving pictures.

The pictures in themselves were a great source of interest and information to them for there they saw engines and parts of engines in actual process of construction; submarine chasers chasing and their much-admired editor actually in converse with one of their number and making the current number of the magazine they know best, MoToR BoatinG.

Their intense enthusiasm was more than evidence that our boys appreciated the privileges that had been accorded them.

Mabelle, a 26-Foot Runabout

An accompanying illustration shows one of the many Belle Isle boats turned out in 1917 by the Belle Isle Boat & Engine Co., of Detroit, Mich. The Mabelle is owned by Fred E. Holmes, of Detroit, and is 26 feet long with a beam of 7 feet 3 inches, powered with a four-cylinder 6 by 6 Van Blerck motor which turns an 18 by 29 propeller 1,500 r.p.m., producing a speed of 34 m.p.h.

Mabelle has made many successful and enjoyable trips to Put-In-Bay and St. Clair Flats, in fact was the most prominent and popular boat on the Detroit River in the summer of 1917. The Belle Isle Boat & Engine Co.'s plant is one of the best equipped shops in the central part of the United States, having a capacity of one boat every ten days, the year around.

Mabelle, a 26-foot runabout with a beam of 7 feet 3 inches, built by the Belle Isle Boat & Engine Co., of Detroit, Mich., for Fred E. Holmes, of Detroit, is powered with a four-cylinder 6 by 6 Van Blerck which produces a speed of 34 m.p.h.

A Little Gray in an Emergency

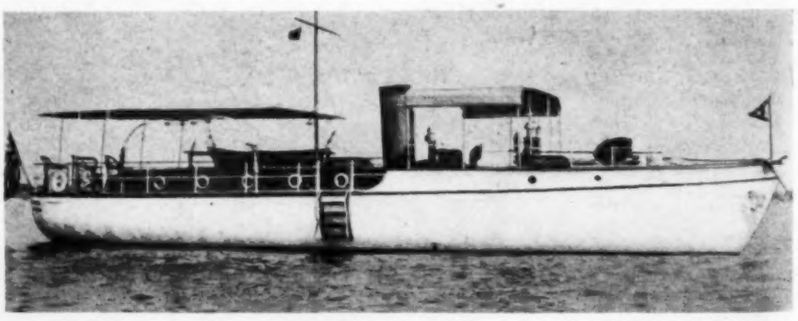
Roamer, which H. Haas, of Brooklyn, N. Y., built for himself from a Monitor K.D. open boat is 22½ feet long with a beam of 6½ feet, with heavy oak frames, finished in white pine and mahogany and well-equipped in every detail. She is suitable to live in all the summer; has clothes lockers, galley, sink, refrigerator, dish lockers underneath sink, running water, combination alcohol and kerosene stove, double extension berths, toilet room and storage lockers, electric and oil light, self-bailing cockpit, wide seat across the cabin bulkhead which forms a roomy engine compartment for the 10-12 h.p. Model D Gray two-cylinder four-cycle power plant, which turns a 16 by 16-inch Columbian three-blade propeller.

Roamer, 22½ feet long with a 6½-foot beam, built for himself by H. Haas, of Brooklyn, N. Y., from a Monitor K.D. open boat is equipped with a 10-12 h.p. Model D Gray two-cylinder four-cycle power plant which turns a 16 by 16-inch Columbian three-blade propeller producing a speed of 5½ m.p.h.

Roamer makes 5½ real miles an hour, which Mr. Haas considers a good performance on account of the heavy build of his boat and the equipment he carries. He cruised on her last summer, with his wife, for seven weeks, covering over 1,000 miles.

On July 22 they went from Black Rock, Bridgeport to New Haven, where they were caught in a terrible squall off the New Haven breakwaters. They lost their tender and it drove the boat of one of their friends on the rocks and here is where the sturdy little Gray engine showed her value. Roamer had a good anchor out with plenty of chain, but the engine was kept going for safety's sake, and seeing that the friends could not be assisted and that the Roamer was drifting fast toward the rocks herself, Mr. Haas thought that he had lost his anchor. He headed directly into the heavy seas for Morris Cove. The storm lasted about a half hour; by that time they had reached the New Haven Yacht Club at Morris Cove, and going forward to pull up the chain Mr. Haas found, to his surprise, that the anchor was still there. They borrowed another tender and went out again to look for their friends and after transferring everything to the Roamer, they kept on bailing for some time, then all hands stood on one side while Mr. Haas patched up some big holes in their friend's boat with canvas, and the Roamer then towed this boat, which is 28 feet long, with 2,700 pounds of iron ballast, to the Morris Cove anchorage.

While waiting for the insurance adjusters temporary repairs were made and it was decided to go to Provi-



Annawets, a 57-footer with a beam of 12 feet 6 inches, designed and built by F. S. Nock, of East Greenwich, R. I., is equipped with a Model F six-cylinder 35-85 h.p. Sterling of the counterbalanced crankshaft type, which produces a speed of 14 knots. She is the property of Charles I. McLaughlin, secretary of the Louis Dejonge Co.

dence for thorough repairs. It can be imagined the work the little Gray engine had to do towing the 28-footer all the way to Providence. From New Haven the party stopped at Duck Island Roads for the night, from there they went to Stonington to take on new supplies, and the following day they went to Point Judith and the next morning started directly for Pawtuxet-Providence. On the way another storm was encountered off Prudence Island, but the little Gray kept right on going, not missing once. Besides being very economical, she is reliable, needs little care and works like a clock.

Annaweta, a 57-Footer

Neither remarkable nor spectacular, just a rather serviceable sea-going cruiser is Annaweta. C. I. McLaughlin's cruiser is a decidedly able craft with a well-planned interior, a type of which an owner never tires and therefore one that lends stability to the boating industry.

She is a bridge-deck cruiser, but the deck does not extend clear across the craft, instead the raised deck forward which ends on the starboard side at the bridge, is continued on the port side, forming a junction with the main cabin, and allowing full headroom in the cabins from stem to stern. Few, if any cruisers of her dimensions (57 feet over all with a beam of 12 feet 6 inches) have this convenient feature or are so fully equipped.

Essentially a one-man control boat, the bridge equipment includes an automobile-type steering wheel, reverse mechanism, engine controls, compass binnacle, Nicholson speed recorder and arc searchlight.

The saloon is furnished with sideboard, containing a refrigerator and ice-water tank, a china locker, extension berths for four guests, additional individual lockers for clothing, a large clothespress, a provision locker and a large dining table. This cabin being the size of the average dining room, readily accommodates a party.

There are two staterooms with linen lockers, clothespresses, bureaus, dressing tables and beds 4 feet 6 inches by 6 feet 4 inches.

The general style is colonial with all interior woodwork of mahogany, except the ceilings, and is well-lighted by large port lights, together with skylights over the saloon. At night electric light fixtures (supplied with current by the generator on the motor, through a large storage battery) brighten the interior.

The galley, while not large, has fulfilled all the requirements called for, a Shipmate stove, sink, dish, provision and other lockers completing the outfit. The forcastle and engine-room are arranged in much the same manner as most craft of this description. There is a large locker forward for chains, wraps, lanterns, etc., and aft of this a toilet for the crew and clothes locker. There is a small table and a seat, two pipe berths and one large locker under the bridge deck on the starboard side of the tank. The main tank for gasoline is situated directly under the bridge deck (200 gallons) and is of galvanized iron set in a pan 6 inches deep, the pan being scuppered overboard. There is a bulkhead built all around the tank. Two tanks, of 20 gallons capacity each, are placed one on each side close under the deck. These are kept filled and used only in case of emergency. The water tanks are of heavy galvanized iron and situated under the after deck. All piping for water is of brass instead of lead, as is usually installed.

The engine is a Model FH six-cylinder 35-85 h.p. Sterling and drives the boat at about 14 knots per hour.

That the boat is entirely seaworthy is shown by the fact that it was the only yacht in the Rhode Island fleet to leave Block Island in the northeasterly storm of August 1, 1909, while the boats of this club were on their cruise. It made the trip to East Greenwich during the height of the blow. Another time when it had a chance to show its behavior in heavy weather was on a run from Marblehead to Providence during the heaviest northeaster of the summer season.

Annaweta measures 57 feet overall length and has a beam of 12 feet 6 inches and a 4-foot draft. She was designed and built by F. S. Nock of East Greenwich, R. I., who is well known as one of our best designers and builders.

One of the airplane motor-erecting floors at the Fiat factory, showing a fine collection of motors ready for delivery to the Allied powers

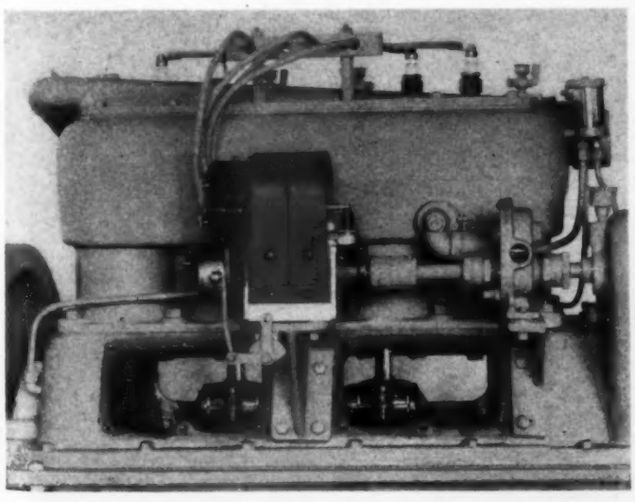
Duesenberg Buys Fiat Plant

Announcement is made that the Duesenberg Motors Corp. has purchased the factory, factory equipment and property of the Fiat Motor Car Co., of Poughkeepsie, N. Y. This has been done in order to increase production on the big contract which the Duesenberg Motors Corp. is now working for the United States Government.

In addition to the purchase of the big Fiat plant, the present large model factoy of the Duesenberg Motors Corp. at Elizabeth, N. J., is to be immediately doubled with a strong possibility of an additional increase in floor space after that.

It is understood that the Fiat Company has anticipated material conditions and labor conditions and have completed the machine work and much of the assembling of their total output for 1918. A small portion of the Poughkeepsie plant is to be used by the Fiat Company for completing the assembling of their 1918 cars and also to act as a service station and repair parts depot. With this big addition to the production ability of their organization, the Duesenberg Motors Corp. can go ahead of their delivery dates in turning over to the Government completed motors so urgently needed in connection with the aviation programme.

The Deusenberg Motors Corp., manufacturers of airplane, automobile, and marine engines, are admittedly one of the most highly-specialized organizations in the country. Their knowledge of both motors and motor manufacturing is such that it is only logical that they should become a big cog in the massive wheel of American airplane production. That this organization has withdrawn all its regular motors from the market and turned its entire resources over to producing motors for the Government, is but additional evidence of how our big commercial institutions are bearing the burden and throwing their every effort back of the Government to bring this war to a quick and successful conclusion.



In order to have complete accessibility to the inside of the Kermath engine manufactured by the Kermath Mfg. Co., of Detroit, the handholes are exceptionally large. This picture shows right through the engine base

World's Height Record Made with a Sia-Fiat Biplane

A world's height record of 23,048 feet with passenger aboard, attained in 1 hour 3 minutes, has been established by Flight Lieut. Francesco Brak Papa of the Italian Army on a Sia-Fiat biplane. The flight was made from the Turin aerodrome on December 14, 1917, the machine carrying a useful load of 792 pounds, and was officially controlled. The rate of climbing was as follows: 3,280 feet were reached in 2 minutes 30 seconds; 6,561 feet in 5 minutes; 9,842 feet in 9 minutes; 13,123 feet in 15 minutes; 16,400 feet in 24 minutes; 19,685 feet in 37 minutes 30 seconds; 21,325 feet in 45 minutes, and the maximum height of 23,048 feet in just over the hour. This record performance was made with a 300 h.p. six-cylinder Fiat water-cooled engine of the same type as the one used for the flight from Turin to London. This engine had four valves per cylinder and direct mounted propeller. The previous height record with a passenger was 21,161 feet and was also held by Flight Lieut. Brak Papa.

Exceptionally Large Handholes of Kermath Engine

A great deal has been said about accessibility of small motors. On one of the accompanying illustrations showing the complete upper half of the Kermath engine, manufactured by the Kermath Mfg. Co., of Detroit, Mich., it may be noted that in the engine construction, in order to have complete accessibility, the handholes are exceptionally large. The various equipments, such as the water pump and magneto that appear on the side of the engine, are mounted on separate brackets, so as not to interfere with getting into the case or necessitate the removal of either of these items in order to get into the case. This picture shows right through the engine with the handhole plates on each side removed.

The handhole plate can be removed without disturbing the starting motor as this all comes off in one unit, the generator does not interfere with taking off the gear cover plate and the motor does not interfere with taking off the handhole plate. So that in no way do either of these interfere with the complete accessibility of the inside of the engine.

Checking the Temperature of Your Cooling System

As the motor boat has become more and more standardized in its design, and as it has taken over, from year to year, devices for control and navigation which have become common practice in the automobile field, so has it become common practice to equip the instrument board with instruments which help the navigator to determine the condition of his ignition system, volume of fuel available, speed of running, etc.

Among these is to be found on many well-equipped boats to-day the latest product of the Moto-Meter Co., of Long Island City, N. Y.—a Boyce Moto-Meter, distance type, which is designed for the purpose of indicating, by an instrument placed on the instrument board, the temperature at which the motor is operating. This device consists of a pressure bulb of solid bronze, which is screwed into the outlet water manifold of the motor at a point as close to the outlet of the last cylinder as possible. A ground flange joint at this point insures against leaks from continual vibration.

From this bulb, and protected by an outer tube of heavy copper, runs a fine capillary of special cross section. This capillary has a volume which is extremely small in relation to the bulb. The tube from this bulb runs directly to the instrument located on the instrument board before the helmsman's eye.

Inside the case of this instrument is a long helical tube of extremely small volume. To this is connected the capillary leading from the bulb in the water manifold. The instrument carries a dial, which is calibrated in degrees Fahrenheit from 32° to 212°. The pointer is mounted concentrically and is colored red. The dial is black with white figures, and shows the zone at which the temperature of the motor should always be maintained. This condition is more easily adjusted on marine engines than it is in motor cars, and is accomplished by simply decreasing the amount of water which cools the motor, by means of a stop-cock or by-pass.

Many tests have shown that a saving in gasoline of from 30 to 40 per cent. may result by an intelligent adjustment of the cooling water supply, as indicated by the moto-meter. The Boyce Moto-meter, distance type, serves as an unfailing danger signal should the motor start to overheat, due to any one of a number of familiar causes, such as lack of lubrication, retarded sparks, failure of water pump, etc. And this is its chief function, for it may be said to be the one instrument of all those installed, which can and does unfailingly save fuel cost at all times and avoid repair bills in an emergency.

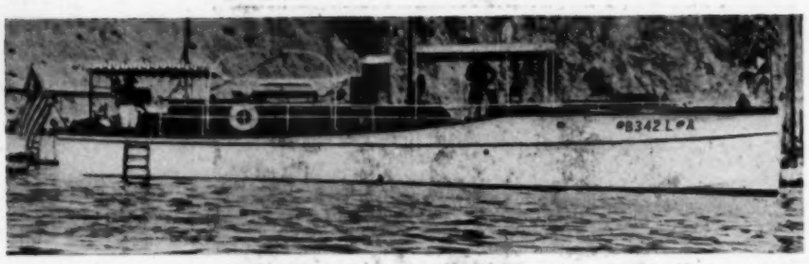
It has been found in the past that the use of a heat indicator of this type which had been designed to show the temperatures of boilers, ovens, etc., under ideal conditions, is far from satisfactory when installed under conditions of vibration and climatic temperature change, which are present in motor boat practice.

Accordingly, this instrument was designed and built for the particular purpose for which it was to be used. Under all conditions of vibration, the needle is found to maintain a steady position, showing the exact temperature of the bulb in the water manifold. It is compensated for atmospheric temperatures to which the instrument and connecting tube may be subjected, under the deck or in the cockpit, whether zero or torrid conditions exist, so that the instrument gives a true reading of water temperature under all conditions.

New Regulations Regarding Exports

Announcement is made in Washington by the War Trade Board of the issuance of its Journal No. 4 promulgating important new regulations regarding exports.

After February 1, 1918, a new export application form X will be used in place of all forms hitherto in existence. It will be the only application form in use. This form X is a little more elaborate than the old form A-2. It has been designed to avoid the necessity of shippers keeping on file various forms, and the Bureau of Exports has endeavored to combine in this one form all requirements.



Ding, a 51-foot express cruiser, designed for Dustin Farnum of film fame by Fellows and Stewart, of Wilmington, Cal. Ding is equipped with two Model F six-cylinder Sterlings of the counterbalanced crankshaft type developing 130-145 h.p. each at 1,400 r.p.m., producing a speed of 24 m.p.h. The picture was taken off the Catalina Islands

It is stated on application form X that all the questions must be answered, but the Board recognizes that there will be instances where it will be difficult, if not impossible, for some of the information to be given by the shippers; and in that event the application will be considered on such information as is furnished by the applicant. If the information furnished by the shipper is not sufficiently complete to enable the Bureau of Exports to act, it will be returned, with a note asking for the additional information desired. In other words, if an applicant can fill out the information blank complete, it will facilitate the handling of the application, because the applicant has then given the Bureau of Exports all desired information.

In addition to this application form various supplementary information forms should be used in accordance with the particular commodity to be exported. These supplementary information forms should be securely pasted on the back of the application form, so that the bottom of the supplementary information sheet and the bottom of form X will be even.

Applications for export licenses for certain foodstuffs require supplementary information form X-1; upper and belting leather require form X-3; tin plate and articles containing tin, form X-4; wool and articles containing wool, form X-5 and sundry other articles require form X-2.

All exporters who have at any time applied to the Bureau of Exports for export licenses are on the mailing list of the War Trade Board and therefore receive regularly the Journal of the War Trade Board. Journal No. 4, issued January 21, contains copies of all the new forms and complete instructions as to their use. In case applications are received without the proper supplementary information form it will be necessary to return the same, and in doing so time is lost unnecessarily, all of which may be avoided by the use of the proper forms on the part of the applicant.

Neither failure on the part of the applicant to take reasonable precaution as to the distribution of goods nor the granting of an export license based upon the statements contained in the application will relieve the consignor from any responsibility to which he may be liable for affording aid or comfort to the enemy.

Any attempt to export a commodity differing in any way from that for which license has been granted is an attempt to export goods without license, and subjects the exporter to the penalty of the law.

If there is reasonable cause to believe that the exportation described herein involves trading directly or indirectly with an "enemy" or "ally of enemy," or with a person acting on behalf of, or for the benefit of an "enemy" or "ally of enemy" as defined in the Trading with the Enemy Act approved October 6, 1917, a separate application for license so to trade must be made on form ET-6, and securely attached thereto and filed with Export Application form X, unless a general license so to trade has been obtained, which fact must be stated thereon.

Champion Spark Plug Co.'s Motor Car Starts on 20,000-Mile Trip

One of the Champion Spark Plug Company's fleet of motor cars has just started on a trip covering 20,000 miles. This car, a Studebaker, left the Toledo offices of the company last week bound for Los Angeles via Chicago, Kansas City, Santa Fe and Phoenix.

The car will be gone twelve months. It is in charge of Vaughn J. Snively and Stanley Matthews. The Champion representatives will distribute advertising material and install window displays for dealers during the ten-months' stay on the coast. The return trip will be made via Salt Lake City and Denver.

Emil Grossman Mfg. Corp. Not Affected by Government Change

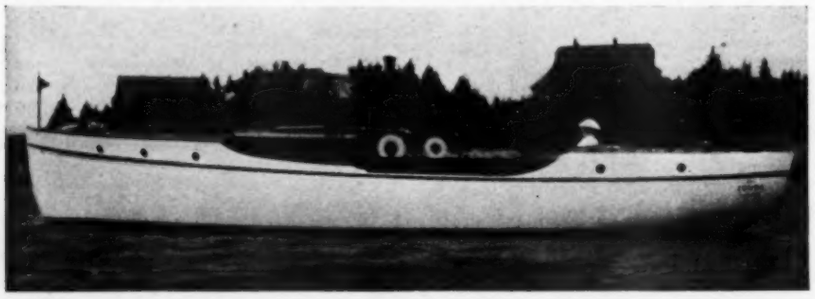
Announcement has been made in the daily papers that the Government has taken over the Bush Terminal property in South Brooklyn. Inasmuch as the Emil Grossman Mfg. Corp., of Brooklyn, N. Y., are located in Bush Terminal Building No. 20 a number of their customers have asked them in what way this will affect their business. They wish to state that the Government has only taken over the Bush docks and warehouse buildings. This does not in any way affect the industrial buildings in which they are located, and they are in a position to make prompt shipments as usual.

Imp III, a 32-foot cruiser with a beam of 8 feet 6 inches, designed and built by her owners, Messrs. Smith and Graves, of Essington, Pa., noted for their efficiency in building patrol vessels. She is powered with a Model D two-cylinder 5½ by 7 Sterling of 12-15 h.p. which produces a speed of 10½ m.p.h.

Ding, the 51-Footer Owned by Dustin Farnum of Film Fame

Almost as luminous a start in a respective field as her owner, Dustin Farnum, the noted actor, Ding, a new express cruiser, has won many races in Southern

(*Continued on page 60*)



Zenda, now in patrol service, owned by Francis S. Eaton, of Boston. A 43-foot compromise stern cruiser with exceptional sea-going qualities, equipped with a Model FH 25-55 h.p. Sterling engine of the counterbalanced crankshaft type, producing a speed of 13 m.p.h. Zenda was designed and built by George Lawley & Son Corp., of Neponset, Mass.

Personalities

Charles Scoville Fredericks

Charles Scoville Fredericks

Charles Scoville Edward DeForest Fredricks was educated for the Episcopalian ministry. He studied until twenty-seven years of age, when as the Bible tells us, he discovered that many are called but few are chosen, and as he was not of the elect concluded to try his predatory instincts upon an unsuspecting business world.

After leaving college, he went abroad for the purpose of cultivating a promising tenor voice, but after studying for nine months he contracted diphtheria. Whether it was the ravishes of the disease or stale anti toxin which the doctors administered it has not been determined, but the result was an absolute loss of his singing voice for a period of seven years.

Upon his return to the United States, he became the sales manager or rather American representative for a Swedish concern at Stockholm, manufacturing drill steel, picks and shovels, for whom he traveled all over the United States, calling on contractors and railroad men generally, mining strippers and miners in all metals.

He established an office on Broad St., New York, and for three years made a great deal of money, but when his first three-year contract expired the company was bought by another concern and as Kipling says "That is another story."

After leaving this company, he joined the Home Pattern Company, then organizing to manufacture and market the Ladies' Home Journal patterns. He remained with this concern for three years in the capacity of sales manager and advertising expert, launching the quarterly and monthly style books. Later he joined the staff of the American Magazine where he did creditable and thoroughly acceptable work for about a year and a half. When Mr. Hearst launched his $2,300,000 American Sunday Magazine, distributed with the five papers he then had, Mr. Fredricks was the one who put that publication on the market.

Subsequently, Mr. Fredricks organized the company of Pullen, Bryant and Fredricks, special representatives for forty-two daily newspapers and a half-dozen magazines. During this period of his experience, he launched the Motion Picture Magazine, the Westerner Magazine and several banking publications, even going so far as to own, edit and publish a magazine of his own.

Mr. Fredricks is now with the Aerothrust Engine Co., of La Porte, Ind.

Howard E. Putnam

Howard E. Putnam, president and general manager of the Gies Gear Co., of Detroit, Mich., has been connected with that organization practically since the formation of the company. He and H. D. Morton took over the business from the Gies Bros. shortly after it had been started.

Howard E. Putnam

There have been changes in the company since that time but Mr. Putnam has been the one to retain the active interest and has successfully managed the business for over ten years. He is popular in the motor boating industry and due to his long association has become one of the old guard.

Fast "torpedo-chasers" are Valsparred—

This boat was built by the Albany Boat Corporation for following and recovering torpedoes discharged in practise by our "Jackies."

She is fast, because a torpedo must be picked up quickly or it sinks.

Like many other Navy boats, she is Valsparred, because Valspar is the most reliable varnish for speed-boats and for every other kind of boat.

Valspar is a long-oil, quick-drying varnish of marvelous durability. It withstands the hardest sea-usage for long periods without turning white.

Valspar is used by leading builders and boat-owners everywhere.

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The Varnish That Won't Turn White

For your paintwork use these Valentine specialties:

Valentine's Yacht White—a waterproof white furnished in either gloss or flat finish.

Valentine's Yacht Black—is fully equal in every respect to the white. Semigloss.

Valspar Bronze Bottom Paint—keeps the bottom free of weeds and marine growth for a whole season. Saves hauling out and scraping.

Valspar Enamels—in a variety of beautiful, permanent colors ground in Valspar. Exceptionally good for canoes and all enameled work. Colors brilliant.

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TRADE VALENTINES VARNISHES MARK

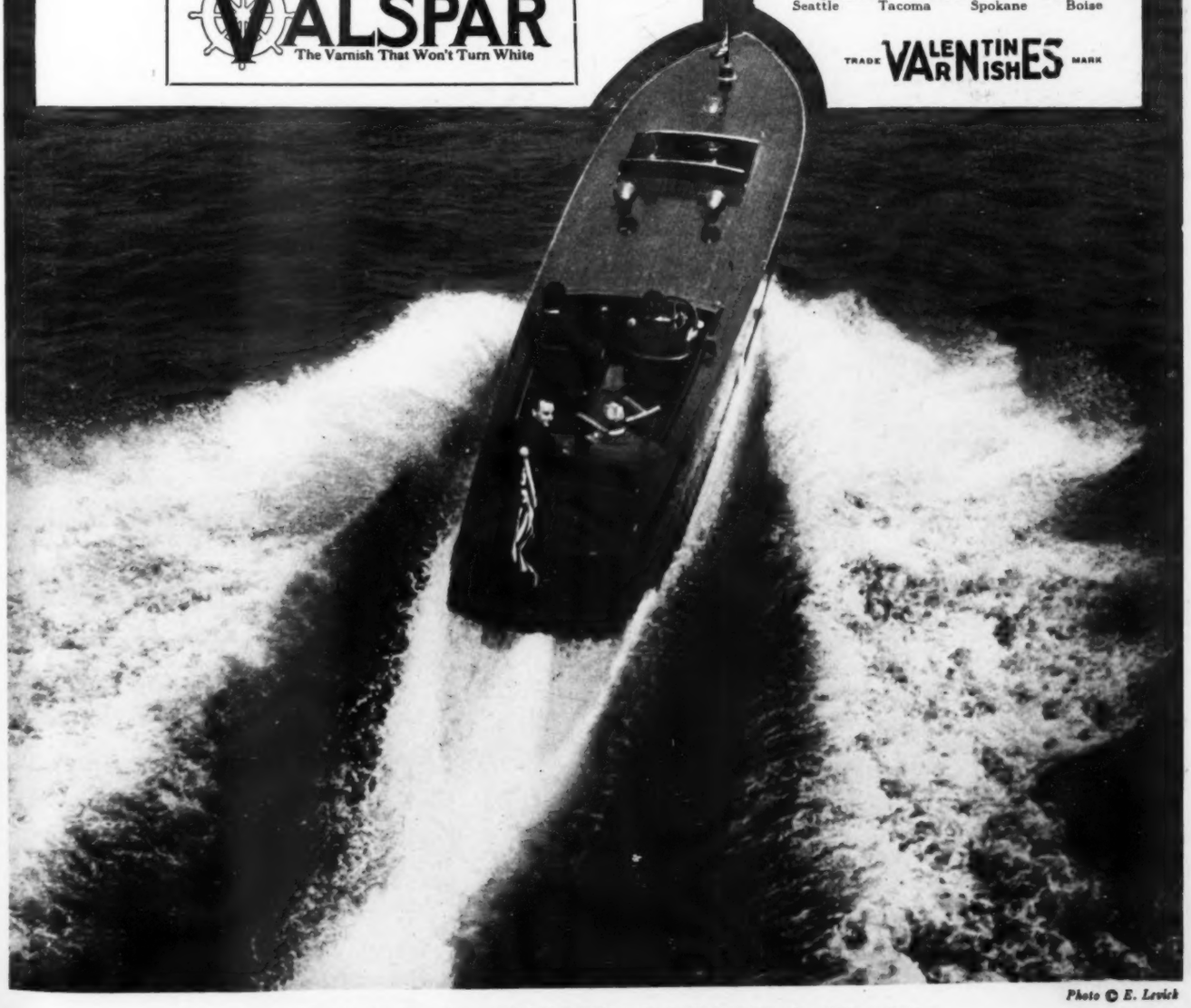

Photo © E. Levick

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Advertising Index will be found on page 102

Naval Architects and Yacht Brokers

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15 William St., New York
Telephone—1375 Broad
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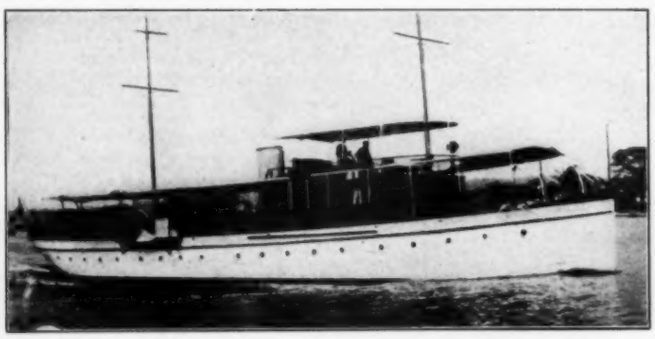
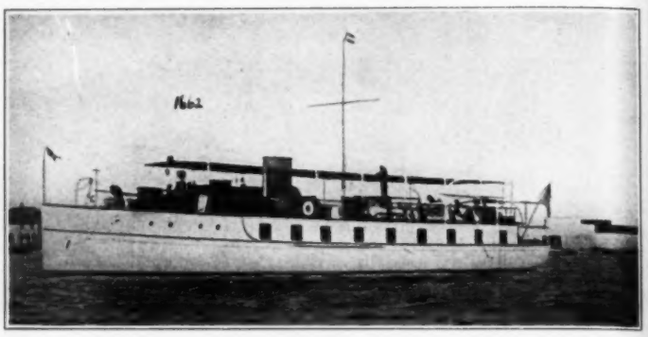
We have a complete list of all steam and power yachts, auxiliaries and houseboats available FOR SALE and CHARTER. A few are shown on this page. Plans, photographs and full particulars furnished on request.

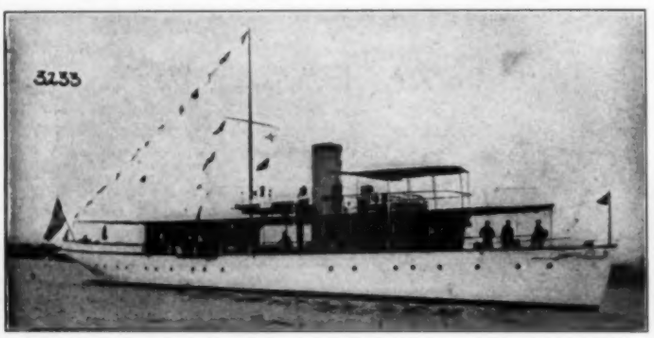
WINTER CHARTER—We specially offer several modern GASOLINE HOUSEBOATS particularly adapted for FLORIDA waters.



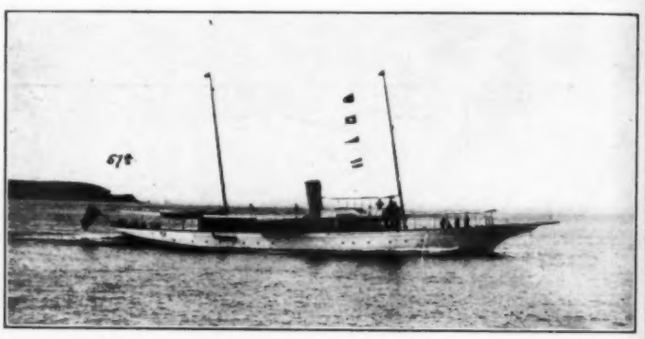
No. 1706—For Sale or Charter—Very roomy, twin screw cruising power yacht, 99 x 17 x 4 ft., adapted for Florida service. Speed 12-14 miles; Standard motors. Large dining saloon, six staterooms, three bathrooms; all conveniences. Cox & Stevens, 15 William Street, New York.



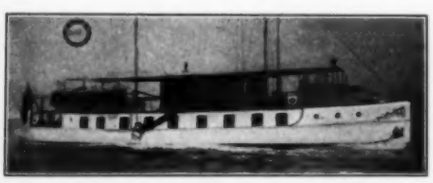
No. 1662—For Charter—Attractive 90 ft. twin screw gasoline houseboat; speed 10-12 miles. Large saloon, four staterooms, two bathrooms; all conveniences. Handsomely furnished. Cox & Stevens, 15 William Street, New York.



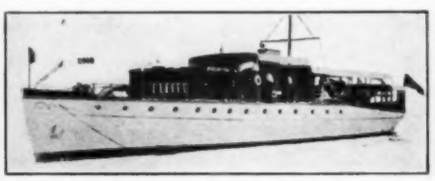
No. 3233—For Sale or Charter—Particularly desirable 123 ft. steel yacht. Speed up to 17 miles. Recent build. Dining saloon and social hall on deck; five staterooms, two bathrooms, etc. Cox & Stevens, 15 William Street, New York.



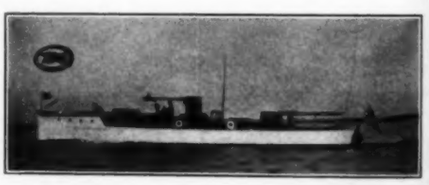
No. 57—For Sale—Fast, steel, steam yacht; 145 x 17.3 x 7 ft. Speed 16 miles. Deck dining saloon, three staterooms, two bathrooms, etc. Handsomely finished and furnished. Fine condition. Estate anxious to sell. Cox & Stevens, 15 William Street, New York.



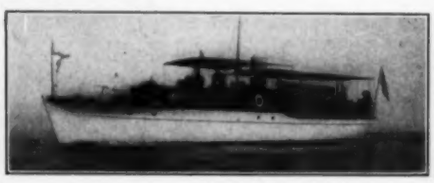
No. 3151—For Sale or Charter—Modern, twin screw gasoline houseboat; 77 x 17.6 x 3 ft. Speed 11 miles. Dining and main saloon, four staterooms, two bathrooms, etc. Attractively fitted. Cox & Stevens, 15 William Street, New York.



No. 2888—For Sale—Twin screw Diesel power yacht; 110 x 18 x 6 ft. Speed 12-14 miles; two 150 H.P. 6 cylinder Craig-Diesel motor. Dining and main saloons; four staterooms, bath, four toilets, etc. Very economical to operate. Cox & Stevens, 15 William Street, New York.

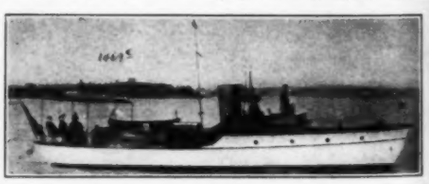


No. 3495—For Sale—Practically new, roomy high speed cruiser (similar to photo): 76 x 13 x 3.6 ft. Speed up to 23 miles. Dining saloon and galley forward; two double staterooms, bath and two toilets aft. Handsomely finished and furnished. Large bridge and cockpit space. Cox & Stevens, 15 William Street, New York.



No. 1692—For Sale—Handsome gasoline cruiser; 66 x 13 x 4 ft. Speed 11-12 miles; 6 cyl. Standard motor. Dining saloon and galley forward; two double staterooms and bath room aft. Best construction and finish. Cox & Stevens, 15 William Street, New York.

No. 3529—For Sale—Fast, up-to-date 60 ft. bridge deck cruiser. Speed 18 miles; 8 cylinder Van Blerck motor (new 1917). Double stateroom, saloon, large galley, etc. Cox & Stevens, 15 William Street, New York.



No. 1469—Bargain—Modern bridge deck cruiser; 52 x 11 x 4 ft. draught; 32/37 H.P. Standard Motor; speed 11 miles. Double stateroom, saloon, galley, toilet room, etc. Interior finish African mahogany. Cox & Stevens, 15 William Street, New York.

No. 3326—For Sale—High speed 53 ft. bridge deck day cruiser. Built 1916. Speed up to 23 miles; 8 cyl. Speedway motor. Best construction and finish. Accommodations for two in saloon, galley, toilet, etc. Cox & Stevens, 15 William Street, New York.

No. 906—Sacrifice—Flush deck, keel auxiliary schooner yacht; 95 x 68 x 20.6 x 10 ft. Large saloon, three staterooms, bath, two toilets. Speed under power 7 miles. Cox & Stevens, 15 William Street, New York.

No. 3481—For Sale—Practically new, high speed bridge deck cruiser; 50 x 11.3 x 2.9 ft. Speed up to 24 miles, 200 H.P. Van Blerck motor. Double stateroom, saloon, electric lights, etc. Handsomely finished. Cox & Stevens, 15 William Street, New York.

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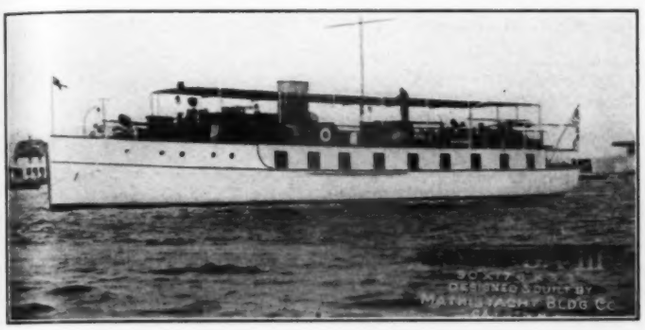
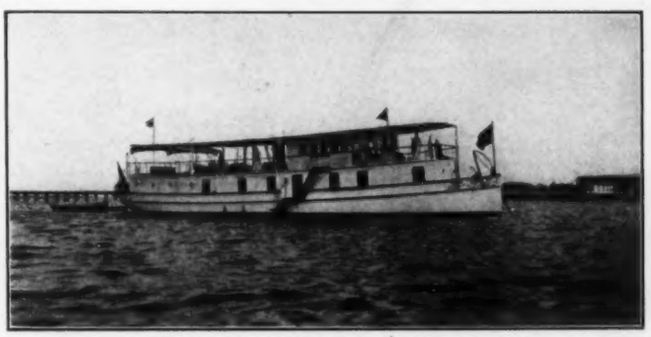
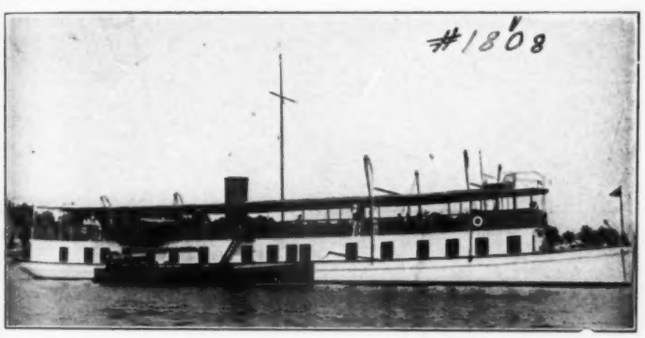
Offer for charter the following desirable houseboats all of which are admirably suited for Florida waters



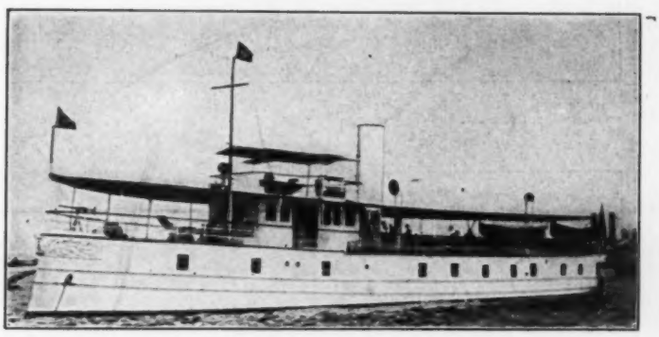
No. 1865—Exceptional opportunity to charter one of the best houseboats available. 90 ft. over all, 17 ft. 6 in. beam and 3 ft. 6 in. draft. 3 staterooms, maid's room, 2 bathrooms and dining saloon.



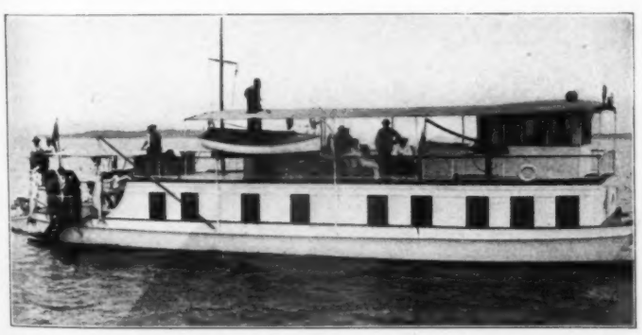
No. 1820—Charter—Desirable houseboat in southern waters, 103 ft. x 20 ft. 4 in. x 3 ft. draft. 4 staterooms, 2 bathrooms, dining saloon and large sitting room.



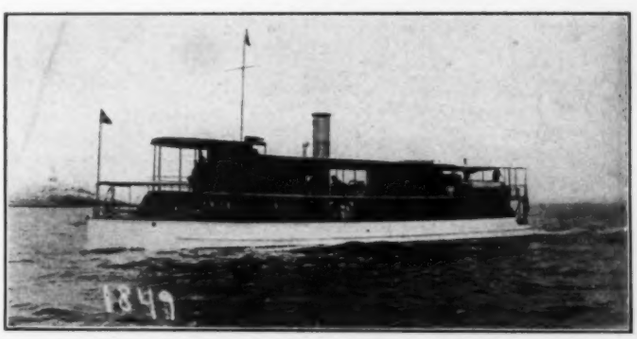
No. 1808—Sale—Charter—Now at Miami. Admirably suited for Florida waters. 125 ft. x 17 ft. 8 in. x 3 ft. 4 in. draft. 4 staterooms, 2 bathrooms, very large dining saloon, ice machine, etc.



No. 243—Sale—Charter—Twin screw steam houseboat, 116 ft. x 21 ft. x 4 ft. draft. 4 staterooms, 3 bathrooms, dining saloon and smoking room.

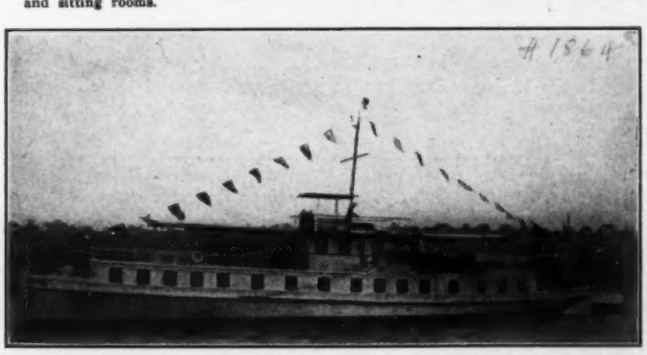


No. 1860—Charter—Shallow draft twin screw houseboat, 70 ft. x 18 ft. 6 in x 18 in. draft. 3 staterooms, bathroom, dining saloon and pilot house.



No. 1849—Charter—Desirable houseboat, 115 ft. x 17 ft. x 3 ft. 6 in. draft. Speed 12 miles. 5 staterooms, 3 bathrooms, main saloon, dining saloon, smoking and sitting rooms.

No. 1847—For Charter—Houseboat now in Florida waters, 85 ft. x 18 ft. x 28 in. draft. 4 staterooms, bathroom, large dining saloon, sitting room, etc.



No. 1864—Charter—Now in Florida waters. Modern houseboat, 110 ft. x 20 ft. x 4 ft. 9 in. draft. 4 Staterooms, dining saloon, sitting room, etc.

NAVAL ARCHITECTS
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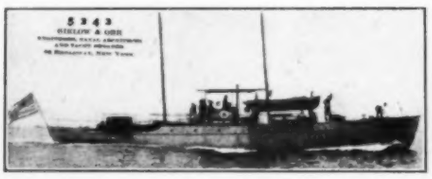
We have a most complete and up-to-date list of steam yachts, power yachts of all sizes, sail, auxiliary and houseboats on file in our office, kept constantly up-to-date by a thorough and comprehensive canvass of the entire yachting field from time to time. We are in a position to submit full information on any type of boat upon request.

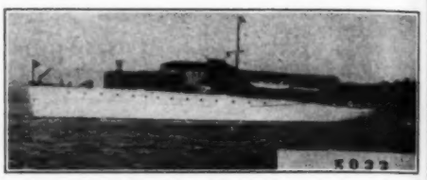
FOR SOUTHERN CRUISING this Winter we offer a number of very desirable POWER HOUSE BOATS and POWER YACHTS which are specially adapted for FLORIDA waters. Last season a great number of clients were much disappointed in not being able to secure for charter a suitable POWER HOUSE BOAT or POWER YACHT owing to the great demand. Yachting this coming WINTER SEASON promises more activity than ever before—so—CHARTER A BOAT NOW AND BE ASSURED OF ONE THIS WINTER.

We can render invaluable assistance in expert appraisals, supervision of alterations and estimates.

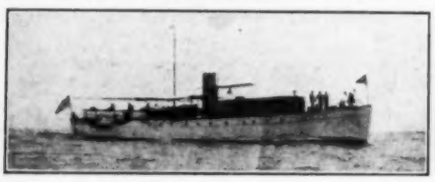
No. 5896—For Sale—A No. 1, 76 foot, twin screw, express power yacht. Built 1917. Hull double planked. Two staterooms, bathroom. Van Blerck motors. Speed up to 23 miles. Located on Lakes. Gielow & Orr, 52 Broadway, New York City.



No. 5242—For Sale—83 foot, twin screw, Lawley built power yacht. Two staterooms, bathroom. Murray & Tregurtha motors. Gielow & Orr, 52 Broadway, New York City.

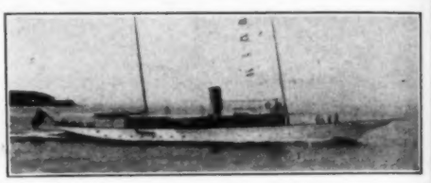


No. 5922—For Sale—Heavily constructed 110 foot, twin screw, Diesel oil motor yacht. Three staterooms, bathroom. In fine condition. Gielow & Orr, 52 Broadway, New York City.

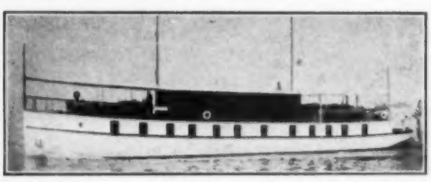


No. 4591—For Sale—High grade and popular 126 foot, twin screw, steel power yacht. Speedway engines. Five staterooms, two bathrooms. Located on Lakes. Gielow & Orr, 52 Broadway, New York City.

No. 2732—For Sale—Remarkably good seagoing auxiliary keel schooner. 72 feet overall, 51 feet 3 inches waterline, 16 feet 6 inches beam, 8 feet 6 inches draft. Two staterooms. Gielow & Orr, 52 Broadway, New York City.

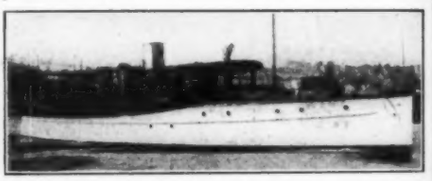


No. 232—For Sale—Handsome, 145 foot steel, steam yacht. Dining saloon, social hall on deck. Well taken care of. In fine condition. Located near New York. Gielow & Orr, 52 Broadway, New York City.



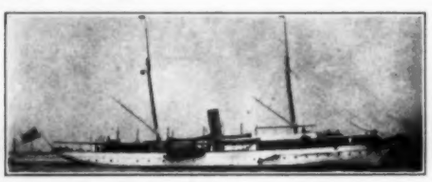
No. 5006—For Charter—For Summer, 100 foot, twin screw, cruising houseboat. One of the finest propositions available. Seven staterooms, three bathrooms. Interior finish mahogany. Winton engines. Gielow & Orr, 52 Broadway, New York City.

No. 6053—For Sale—High grade, 75 foot, twin screw, power yacht. Built 1917. 20th Century motors. Mahogany and white enamel. Three staterooms, bathroom. Gielow & Orr, 52 Broadway, New York City.

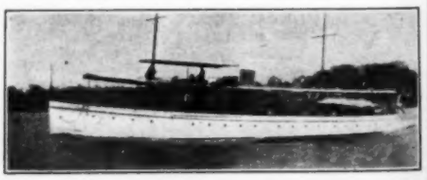


No. 5489—For Sale and Charter—High speed 72 foot power yacht. Speedway build. Speedway engines. Hull double planked. Two double staterooms, bathroom. Gielow & Orr, 52 Broadway, New York City.

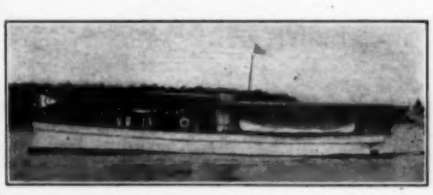
No. 5957—For Sale—Popular 50 foot Elco build, raised deck cruiser. Built 1917. Owner's private stateroom. Sterling engine. Fine sea boat. White enamel and mahogany interior finish. Gielow & Orr, 52 Broadway, New York City.



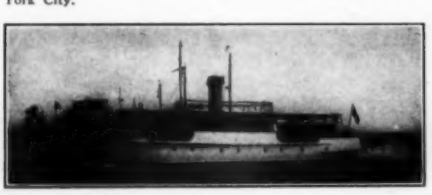
No. 1072—For Sale—Heavily constructed, 181 foot, steel, steam yacht. Eight staterooms, three bathrooms. Triple expansion engines. Scotch boiler. Fine sea boat. Well taken care of. Located near New York. Gielow & Orr, 52 Broadway, New York City.



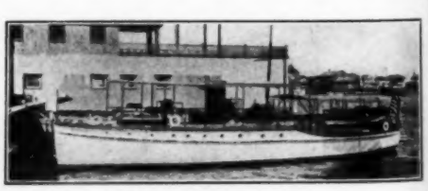
No. 3710—For Sale—Unusually fine and well kept up 99 foot twin screw motor yacht. Six staterooms, three bathrooms. Standard motors. Deck dining saloon. Located near New York. Gielow & Orr, 52 Broadway, New York City.



No. 5413—For Sale—Well appearing 64 foot cruising power yacht. Joiner work by Lawley. Double stateroom. Mahogany and white interior. Standard motor. Gielow & Orr, 52 Broadway, New York City.



No. 6021—For Sale—Well built 71 foot power yacht. Built 1917. Three double staterooms, bathroom, Craig engine. Gielow & Orr, 52 Broadway, New York City.



No. 5584—For Sale—Exceptionally well built 60 foot twin screw, trunk cabin cruiser. Standard motors. Mahogany and white enamel, interior finish. Gielow & Orr, 52 Broadway, New York City.

No. 1603—For Sale—Fine sailing auxiliary keel schooner, 69 feet overall, 45 feet waterline, 15 feet beam, 9 feet 6 inches draft. Built by Lawley. 20th Century motor. Two staterooms. Gielow & Orr, 52 Broadway, New York City.

No. 5065—For Sale and Charter—Attractive 106 foot deep sea cruising power yacht. Four staterooms, bathroom. Standard motor. Well taken care of. Gielow & Orr, 52 Broadway, New York City.

No. 6025—For Sale—Twin screw, shallow draft, motor yacht. Two staterooms, bathroom. 20th Century engines. Mahogany finish interior. Gielow & Orr, 52 Broadway, New York City.

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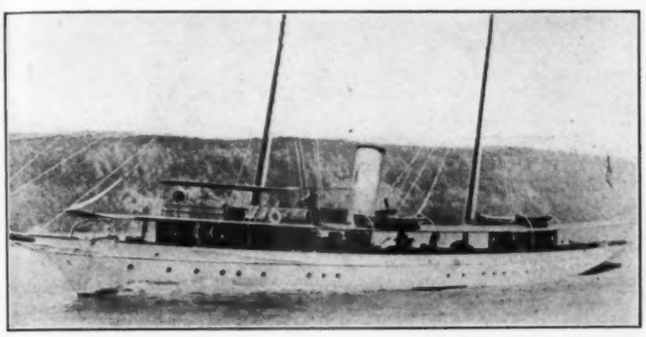
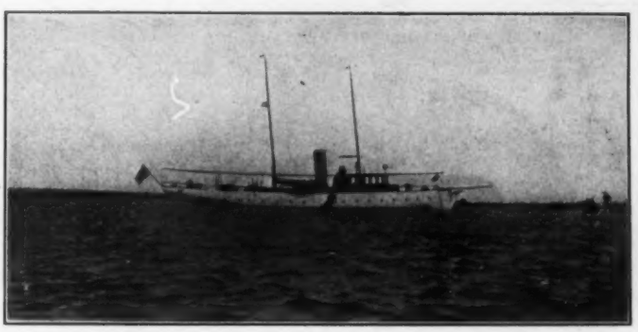
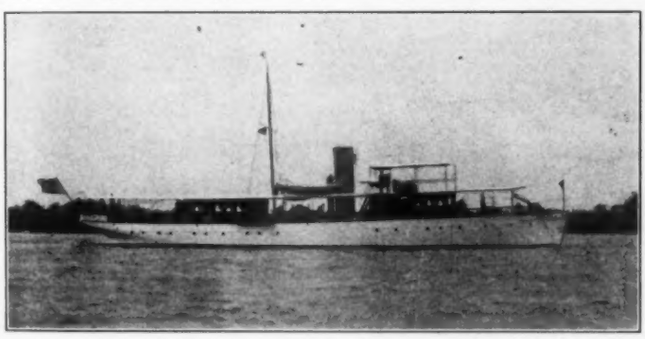


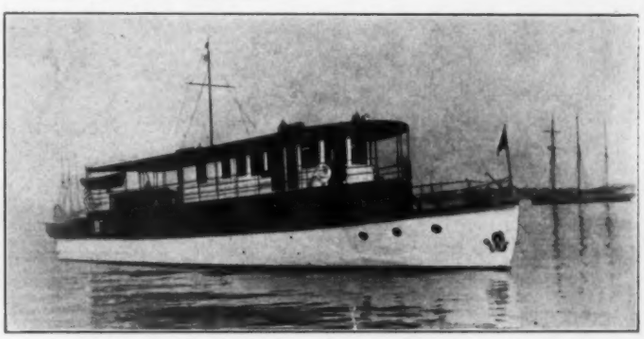
No. 238—For Sale—Steel steam yacht, 170′ x 21′ x 8′ draft. Large dining saloon, social hall and smoking room on deck; 5 staterooms, 3 bathrooms, etc. Completely equipped.



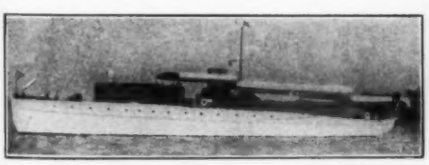
No. 434—For Sale—129 ft. steam yacht; has deck dining saloon, 3 staterooms, bathroom, etc. Price very attractive for quick sale.



No. 646—For Sale or Charter—Steam yacht 123 ft. x 17 ft. x 6 ft. draft. 5 staterooms, 3 bathrooms. Dining saloon and social hall on deck.

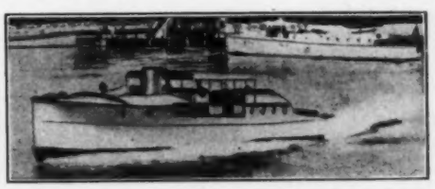


No. 85—Sale, Charter—Florida waters, houseboat, 85′ x 18′ x 30″ draft; 100 h.p. Sterling engine. Large social hall, 3 staterooms, bathroom, etc.

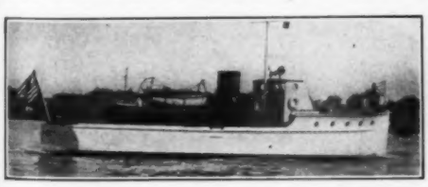


No. 1937—Diesel Power Yacht, 110 x 18, two 6 cylinder 150/180 H.P. engines, low fuel cost.

No. 2355—Bridge deck cruiser, 45 x 9.6, Lamb motor, 24 H.P.; quick sale desired.

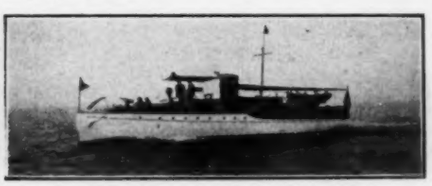


No. 2314—Express cruiser, 50 x 11.3, Van Blerck 200 H.P. motor, speed 22 miles.

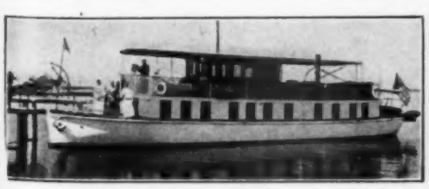


No. 2386—New Patrol type, 54 x 11.2, eight cylinder Van Blerck, speed 17 miles.

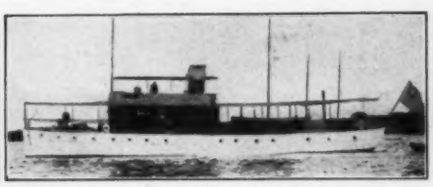
No. 2005—Cabin Cruiser, 62 x 15, Twentieth Century motor, ketch rig.



No. 1738—Raised Deck Cruiser, 65 x 11, six cylinder motor, good accommodation.



No. 37—Offered by Estate—Florida waters—70 ft. shoal draft houseboat, two Sterling motors, three staterooms, etc.



No. 1821—Flush Deck Power Yacht, 90 x 15.3, two 60 H.P. motors, 3 staterooms, etc.

No. 924—Power Yacht, 92 ft., 100/125 H.P. 20th Century motor, splendid deck space.

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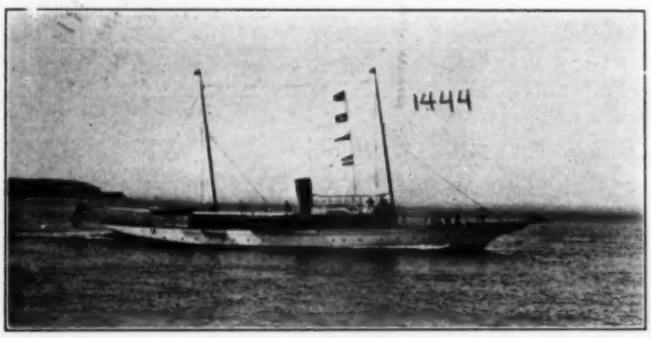
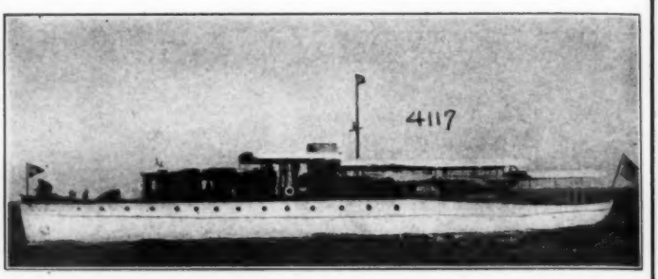
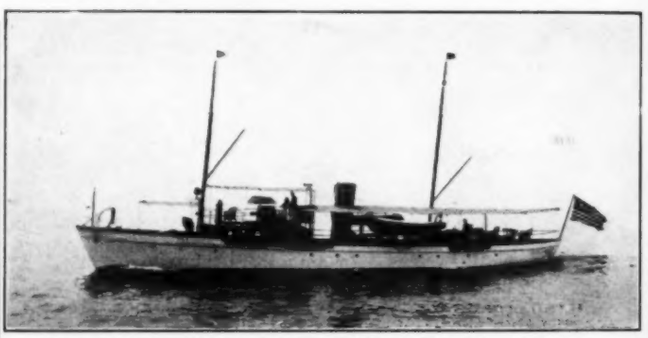


No. 1444—For Sale—Steel Steam Yacht. Length 145 ft.; of best design and build and in A-1 condition; speed 16 knots. Frank Bowne Jones, Agent, 29 Broadway, New York.

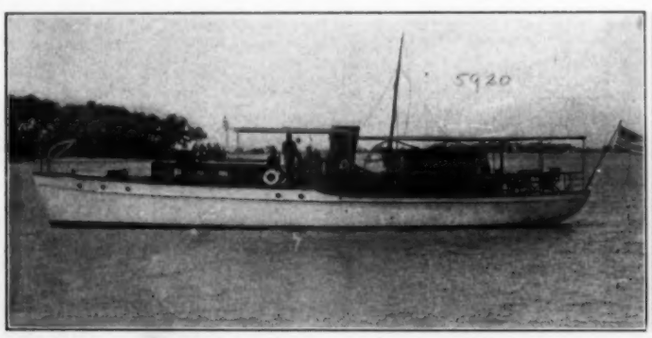


No. 4117—Sea Going Power Yacht. Length 110 ft.; twin screw; two Diesel engines; excellent accommodations; desirable vessel in every way. Frank Bowne Jones, Agent, 29 Broadway, New York.

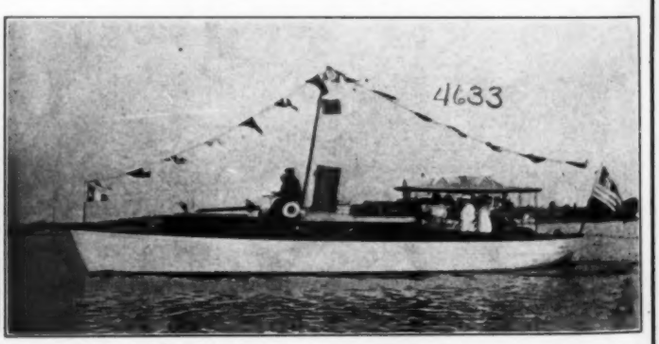
No. 5510—Twin Screw Gasoline Cruiser. Length 83 ft.; Lawley build; an excellent yacht at a reasonable price. Frank Bowne Jones, Agent, 29 Broadway, New York.



No. 3191—For Sale—Probably the best Gasoline Yacht of her size; condition good as new; reasonable price; especially adapted for the Outside Patrol Service as well as for general yachting service. Length 96 ft.; beam 14 ft.; draft 4 ft. 9 in.; flush deck; twin screw; new Sterling engines; 15 miles speed; Lawley build. Frank Bowne Jones, Yacht Agent, 29 Broadway, New York. Yachts of all types for sale and charter.

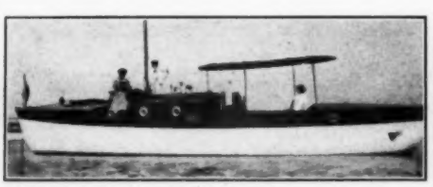


No. 5920—Gasoline Cruiser. Length 66 ft.; accommodations include 2 staterooms, dining saloon and bath; 6 cylinder Standard motor. Frank Bowne Jones, Agent, 29 Broadway, New York.



No. 4633—Gasoline Cruiser. Length 44 ft.; Trunk Cabin type; bridge control; best design and build. Frank Bowne Jones, Agent, 29 Broadway, New York.

No. 5380—Express Cruiser. Length 55 ft.; built last year; 8 cylinder Duesenberg motor; speed 28 miles; attractive price; best boat of the type. Frank Bowne Jones, Agent, 29 Broadway, New York.



No. 4549—Gasoline Cruiser. Length 37 ft.; double cabin type with intermediate cockpit; double stateroom and saloon; new engine; a very desirable boat. Frank Bowne Jones, Agent, 29 Broadway, New York.

No. 6502—Fast Runabout. Length 35 ft.; Elco Express; with or without motor; low price. Frank Bowne Jones, Agent, 29 Broadway, New York.

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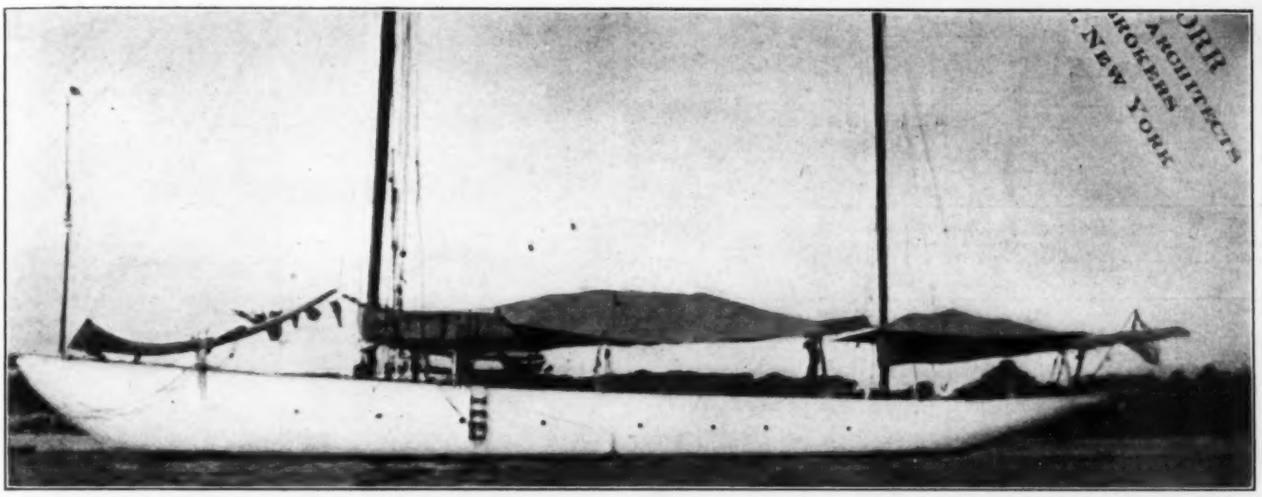
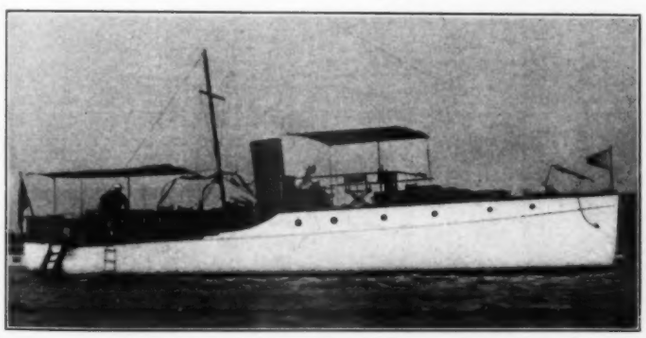
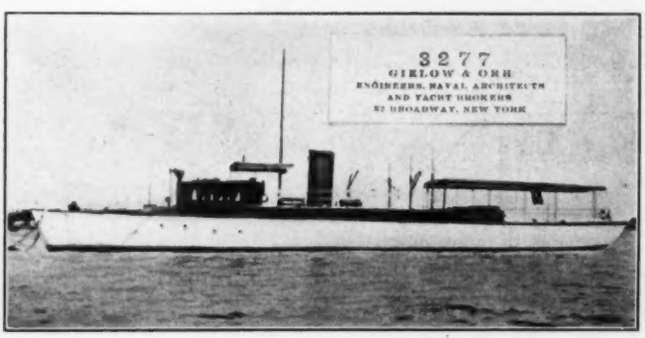


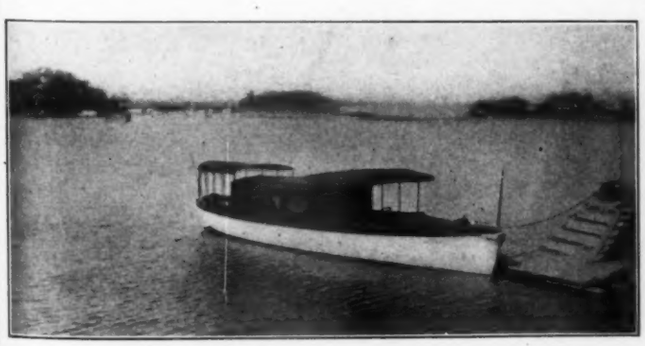
No. 5913—FOR SALE—A most popular flush deck and cockpit auxiliary centerboard ketch in perfect condition Length overall 94 feet, waterline 69 feet, beam 20 feet 7 inches, draft 7 feet 9 inches; designed by Crowninshield; built by Lawley in 1915. Extra heavy construction. Interior finish butternut and red mahogany. Four staterooms. Total sleeping accommodations 7 to 9. Equipped with Wolverine motor. Deck, hatches, and companionways of teak. Sails new 1915. Located near New York. Inspection invited. Gielow & Orr, 52 Broadway, New York City.



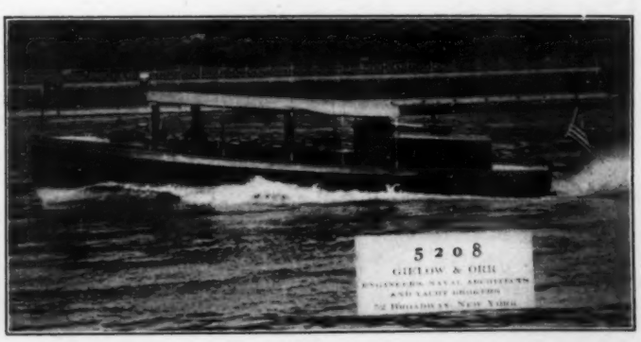
No. 5655—FOR SALE—Practically new 53-foot raised deck cruiser. Beam 11 feet, draft 3 feet 6 inches. 100 horsepower Wisconsin motor. Speed 12 to 14 knots. Finished inside in mahogany. Sleeping accommodations 6 to 10. Well taken care of and in fine condition. Gielow & Orr, 52 Broadway, New York City.



No. 3277—FOR SALE—92-foot twin screw motor yacht equipped with six cylinder Sterling engines. Three staterooms, dining and main saloons and bathroom. Interior finished in mahogany. Gielow & Orr, 52 Broadway, New York City.



No. 5519—For Sale—Attractive 40 foot day cruiser. Can be obtained at great bargain. Six cylinder motor. Boat has been well taken care of. Inspection invited. Gielow & Orr, 52 Broadway, New York City, or Chicago Steamboat Exchange, 350 North Clark St., Chicago, Ill.



No. 5208—FOR SALE—40-foot double planked mahogany express day cruiser. 8 cylinder Sterling motor. Speed up to twenty-three miles. In excellent shape. Located near New York for inspection Gielow & Orr, 52 Broadway, New York City, or Chicago Steamboat Exchange, Chicago, Ill.

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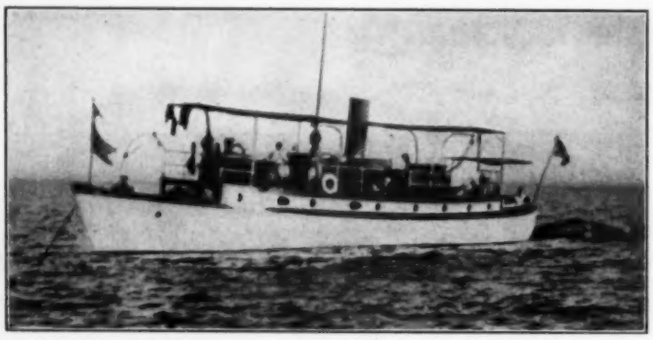
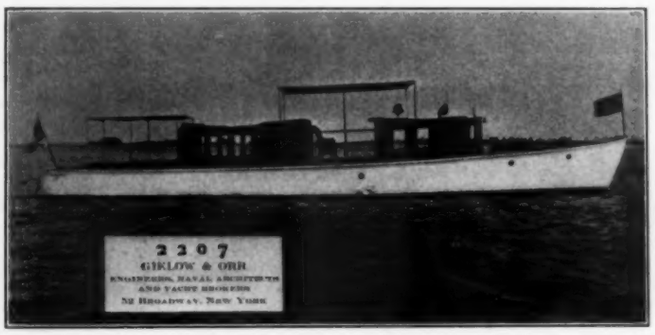
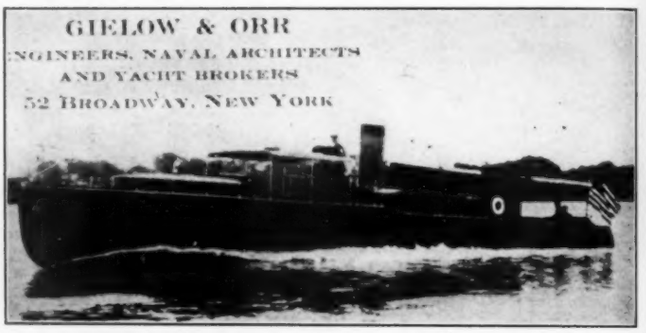


No. 1548—FOR SALE—Unusual seaworthy 65 foot trunk cabin cruiser. Ample deck accommodations, roomy living quarters, two staterooms, dining saloon and bathroom. Standard motor. Gielow & Orr, 52 Broadway, New York City.

No. 43—FOR SALE—Flush deck, auxiliary schooner. Length 95 feet, beam 20 feet 6 inches, draft 10 feet. Three staterooms, bathroom, player piano. Mahogany interior. Sails good. Fast sailer and good seaboat. Gielow & Orr, 52 Broadway, New York City.

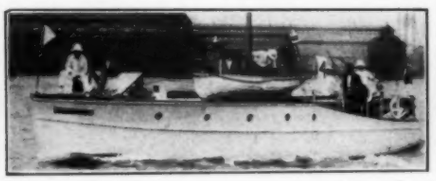


No. 2207—FOR SALE—Handsome day cruiser, 51 feet by 8 feet 2 inches by 3 feet 6 inches. Finished inside in mahogany. Two berths. 4 cylinder 60 horsepower Jaeger motor. Boat and engine in good condition. Large cockpit aft. Bridge deck amidships. Gielow & Orr, 52 Broadway, New York City.

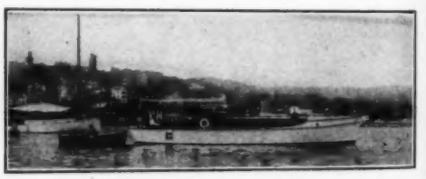


No. 5488—FOR SALE—64 foot twin screw express cruiser. Equipped with two 6 cylinder 125 horsepower Van Blerck motors. Speed up to 26 miles. Would make ideal boat for fast ferry service. Constructed of oak and cedar; teak decks; copper fastened throughout. In excellent condition. Gielow & Orr, 52 Broadway, New York City.

No. 420—FOR SALE—Attractive 61 foot cruising power yacht. Sleeps 4 to 6 people. Craig engine. Inspection invited. Can be purchased at attractive figure. Gielow & Orr, 52 Broadway, New York City.

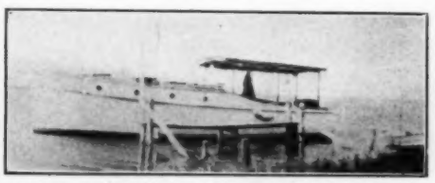


No. 4441—FOR SALE—Raised deck cruiser 45 feet by 11 feet by 3 feet 4 inches; Sterling engine. Electric self-starter Sleeping accommodations for four people. Boat in good condition. Gielow & Orr, 52 Broadway, New York City.

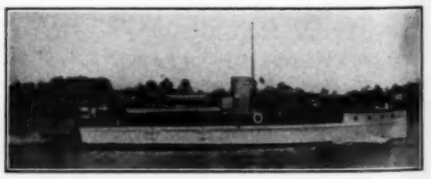


No. 3628—FOR SALE—40 foot raised deck cruiser. Completely equipped for cruising. Has 6 cylinder Sterling engine. Speed up to 14 miles. Gielow & Orr, 52 Broadway, New York City.

No. 5716—FOR SALE—45 foot Bridge deck cruiser, built by Elco. Standard motor. Owner's private stateroom. Sleeping accommodations 6 to 8. Price attractive. Gielow & Orr, 52 Broadway, New York City.



No. 5312—FOR SALE—Popular raised deck cruiser. Van Blerck motor. Sleeps 3 to 4 people. Finished white enamel and mahogany. Inspection invited. Gielow & Orr, 52 Broadway, New York City.



No. 5672—FOR SALE—Practically new 60 foot twin screw express cruiser. Sterling engines, speed 18 to 20 miles. Sleeps 5 to 6. Price attractive. Gielow & Orr, 52 Broadway, New York City.

No. 3775—FOR SALE—Popular 66 foot raised deck cruiser. Matthews built. Standard motor. Three staterooms, bathroom, deck dining saloon. Price attractive. Gielow & Orr, 52 Broadway, New York City.

No. 3663—FOR SALE—Fine appearing 70 foot raised deck motor yacht. Double stateroom. Main saloon 14 feet long. Reliable 6 cylinder 75 horsepower gasoline engine. 1914 motor. Boat has always had excellent care and attention. Must be seen to be appreciated. Gielow & Orr, 52 Broadway, New York City.

No. 6018—FOR SALE—Most attractive small practical cruiser afloat. 32 feet by 8 feet 6 inches by 2 feet 3 inches draft. Sleeps six. 4 cylinder 24 horsepower Lamb engine, electric self-starter. Gielow & Orr, 52 Broadway, New York City.

THE MOTOR BOATING MARKET PLACE

The rate for "For Sale" and "Want" advertisements is 3 cents per word, minimum 75 cents. If an illustration is used, the charge is as follows, which includes the making of the cut:
Cut one inch deep, one column wide..... $2
Cut 1½ inches deep, 1½ columns wide..... $5
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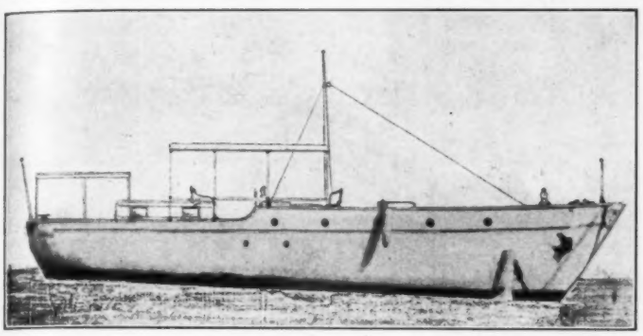
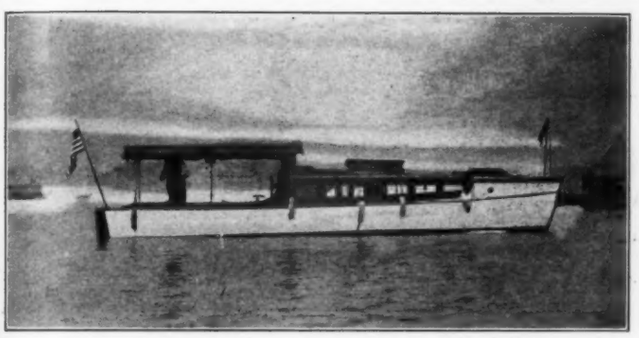
Opportunities for the Motor Boatman

Before you buy or before you sell examine the exceptional buying and selling opportunities under the heading. They comprise the best offer of the month. Please mention MoToR BoatinG.



FOR SALE—40 x 9 bridge deck cruiser, two cabins, separate engine compartment, toilet and wash room, 1918 25/30 Horsepower Palmer engine. Speed 9-10 miles. Boat guaranteed in every respect—price $2200. Can be seen at Launch Exchange & Repair Works, Edgewater, N. J. any time. Property of William Schiff, 80 Maiden Lane, New York City.



LENGTH 33Ft.—BEAM 7 Ft.—DRAUGHT 2 Ft. 6 Inches.

Built of Cedar; Oak frame, copper fastenings; all upper structure—furnishings, doors—solid mahogany. Sand's toilet; locker room and wash-basin forward; followed by main cabin with two berths; then galley and engine with pipe berth for man; large cockpit aft. Large mahogany ice box, sink and wardrobe.

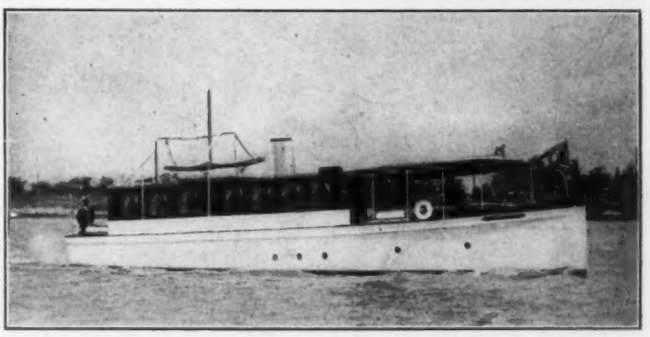
Boat is in first-class condition; has 25 H.P. Sterling engine. Boat is electrically lighted throughout, and has electric self-starter; has large searchlight and powerful Klaxon; has two new gasoline tanks—60 gallon capacity; and fresh water tank, and running water piped all over the boat; has plenty of rope, tools and accessories, and must be seen to be appreciated. Every inch is utilized to its best advantage, and has all the comforts of boats three times its size.

Boat goes fifteen (15) miles cruising speed, eighteen (18) miles per hour forced speed; has new tender, copper finished, very solidly built, with oars and sails.

Engine has been thoroughly overhauled and is as good as new; has bilge pump, and boat is therefore kept absolutely dry all the time.

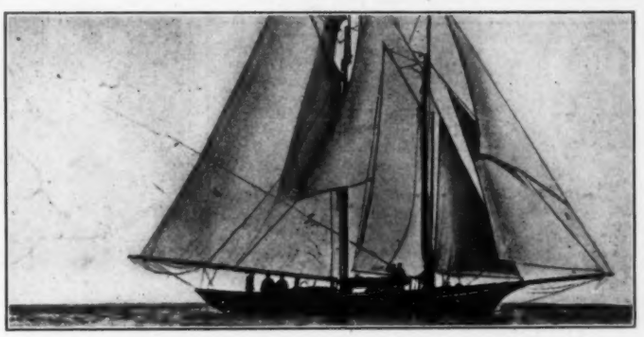
PRICE, $2500.00

Address F. G., Post Office Box 1200, New York City.



Cabin Cruiser 65 ft. x 12 ft. x 3 ft. 9 in. 6 cylinder Sterling engine 85 to 145 H.P. Electrically equipped thruout. Speed 14 m. 2 staterooms and 16 ft. saloon, luxuriously furnished 2 toilets, galley and large stowage space. Complete outfit of silver, china, linens, etc. Fully equipped, including power tender. Water tank 75 gal., gasoline 400 gal.

Frames, white oak 1¾ in. x 2¾ in. spaced 10 in., planking, Louisiana cypress 1¼ in., fastenings copper and brass. Built at a well known plant and launched in July, 1917. Price $12,000.00 for quick sale. Inspectable at Toledo, Ohio. O. W. Nelson, 420 Gardner Bldg., Toledo, Ohio.



FOR SALE AUXILIARY SCHOONER YACHT DIABLESSE

Length over all 52 ft., length water line 39.6 ft., beam 15 ft., draught 7 ft., tonnage 21 gross, 6.2 tons net. Engine, 25 H.P. heavy duty. Speed 8 miles. 2 staterooms and main cabin. Sleeping accommodations for 7 aft, and three in forecastle. Yacht fully found, and completely overhauled last Summer. Under sail, fast, able and nimble. Now at City Island, Nevin's Yard. Address all inquiries to L. J. O'Reilly, P. O. Box 1740, New York City.

FOR SALE—16 H.P. 2 cyl. Erd motor, complete with Bosch magneto, reversing gear and rear starter, $175.00. 12 H.P. 2 cyl. 4 cycle heavy duty Monarch, $125.00—and 70 others—one to 60 H.P. Reversing gears, propellers, etc. Send for complete list. Jesiek Boat Co., Grand Rapids, Mich.

GUARANTEED REBUILT ENGINES

The following engines are overhauled in our own shop and guaranteed to be in good running order with equipment listed. These are engines we have taken in trade on new engines and can be bought at the following low prices which we allow for them in trade:

GRAY 10-12 h.p. 2-cyl. 4-cycle. Bore 3¾", Stroke 4½". Complete with reverse gear, carburetor, magneto, coil, spark plugs and wire. Has been factory overhauled and is guaranteed to be in perfect running order. $225.00.

BUFFALO: 15 h.p. 4-cyl. Complete with reverse gear and new Atwater-Kent ignition, $275.00.

GRAY: 6 h.p. single cyl. Complete with ignition outfit, $60.00.

VAN BLERCK: 8-cyl. 115 h.p. with complete equipment including electric starting and lighting outfit. Practically new, used only one season, $2200.00.

PALMER: 5 h.p. 2-cyl. Complete with Paragon reverse gear. This is a new engine, never having been in a boat, $100.00.

Send for complete list of over thirty engines. Especially good chance to buy a guaranteed second-hand engine at from one-half to one-third cost of a new one. Walter H. Moreton, 214 State St., Boston, Mass.

FOR SALE—A few 8 cylinder 6 x 6 Van Blerck Motors, 150 H.P. at 950 r.p.m., for kerosene, entirely new engines, originally intended for shipment to Russia, for sale at a bargain. Full particulars upon application. Melchior, Armstrong & Dessau, Inc., Dept. No. 1, 116 Broad St., New York, N. Y.

Launches, rowboats, big bargains, new samples and second-hand in all sizes. Several engines, all sizes. Send for list. Everett Hunter Boat Co., Dept. B, McHenry, Ill.

WANTED—30-40—4 cylinder, 4 cycle motor, 1917-1918 Model, carrying new motor guarantee, weight not to exceed 650 lbs., Dual Ignition Magneto, generator, storage batteries, reverse gear, self starting device, bronze shaft, stuffing box, propeller. Full particulars in every detail with lowest cash price only entertained. Address by letter to Oberle, 238 East 42nd Street, New York City.

Boat 61 ft. long, 11 ft. beam, 4 ft. draft. Speed 13 miles. 6-cylinder 60 H.P. Campbell Motor. Motor run only 4 months. Hull in A-1 shape. Price $2500 Cash. North Star Boat Line, Ortonville, Minn.

DON'T SCRAP YOUR ENGINE ON ACCOUNT OF SCORED CYLINDERS OR POROUS HOLES. We repair them by our Patented Process—fusing a silver and nickel alloy electrically without warping or enlarging the bore. Write to our nearest plant. L. Lawrence & Co., New York, 546 W. 45th St.; Detroit, 1246 E. Jefferson; Chicago, 1522 Michigan Ave.; Newark, N. J., 292 Halsey St.

BARGAIN FOR CASH—Raised deck cruiser, 38 feet, 20 H.P. Twentieth Century engine, complete cruising inventory, sleeps six. $1,200. Landy, 50 Church St., N. Y.

Bosch Magnetos all models. Eiseman, Splitdorf and Remy Magnetos always on hand. Also coils. Price list sent. D. B. Lenthe, Ordway Building, Newark, N. J.

USE "SNAPPER" ENGINES for your small boat. They are a big little engine built by The Automatic Machine Co., Bridgeport, Conn.

A few medium and high speed, one, two, four and six cylinder, four-cycle marine motors, new or rebuilt. Reliance Motor Boat Co., 210th Street and Harlem River, New York City.

40 MILES AN HOUR

40 MILES an hour is a barrel of fun. Sensation equals 70 miles an hour by motor car. I have a hydroplane that is a dandy in wonderful condition. 20 ft. long. Six cylinder, double planked mahogany, painted white. Dixie, Jr. Model. Built for a millionaire, cost about $5,000. All ready to run. Seaworthy, attractive. Be the first to take this snap. That's how I bought her. Could have made $500 by not touching her last season and give you this privilege now. Price $1850. Only reason for selling—Government commandeered my yacht and am getting out of yachting. Thurston Seabury, 3 College Street, Providence, R. I.

FOR SALE—Solid mahogany, copper riveted runabout, like new; length, 32 feet; beam, 5 feet; high speed 4 cylinder, 4 cycle 35-40 H.P. engine, Bosch ignition. Furnished in wicker, auto top, windshield, Warner Revolution indicator, electric lighting, etc. Exceptional bargain at $900.00. F. J. Walker, Jr., 1482 Broadway, New York City.

NEW MOTOR FULLY EQUIPPED

6 cylinder T-head, 4 cycle, 60 to 70 H.P., aluminum base, all enclosed. Weight eight hundred fifty pounds. Inquire P. A. W., c/o Motor Boating.

WANTED—Good machinist capable of *installing and testing* engines in boats. Address Box 1, Motor Boating.

Extraordinary values in dependable *four cycle* standard make auto engines, fine for power boats and ice sleds:

H.P. at 1000 rev.			H.P. at 600 rev.		
H.P.	Four cyl. auto engine.		H.P.	One cyl. marine engine	
12	Universal	$55	1	Racine	$22
20	Studebaker	70	3	Pierce	35
20	Ford and transmission	75	5	Graves	55
22	Buick	70	6	Termant-Monahan and gear	70
25	Mitchell	70	12	Barber	85
25	Krit unit plant	95	12	Rockford, 2 cyl.	80
30	Reo	85	25	Barber, 3 cyl.	135
30	Regal	75		Many others.	
30	Cadillac	95			
35	Rambler	85			
50	Rambler	120			
50	Mitchell six	135			
60	Winton six	165			
60	Franklin six, air cooled	135			

High and low tension magnetos, carburetors, coils, mechanical oilers, etc., very low prices.

State your requirements.

Hundred others complete with magnetos and everything.

BADGER MOTOR COMPANY, Milwaukee, Mis.

FOR SALE—Eight Cylinder 5¾ x 6 Sterling motor, complete with electric self-starter, condition guaranteed. Apply D. B. Roberts, 51 Elm St., Hartford, Conn.

Kermath 4-cylinder, 4-cycle engines, factory overhauled and guaranteed. We have some splendid bargains at $135.00 and up. Write for list. Kermath Mfg. Co., Detroit, Mich.

CANADIANS, Second-hand engine bargains. Send for list.
GUARANTEE MOTOR COMPANY
73 Bay Street, North Hamilton, Ont., Canada

Trimount Whistle Blower Outfits

Blower runs by friction contact with engine flywheel. Whistle of brass, nickel-plated.

Made in 3 sizes.

Trimount Rotary Hand Bilge Pumps

All bronze composition. Suction lift 6 to 20 feet. A lifelong convenience.

Made in 3 sizes.

TRIMOUNT ROTARY POWER CO.
20 Heath Street Boston, Mass.
(Factory: Whiting Ave., East Dedham, Mass.)

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Cut three inches deep, three columns wide..... $15

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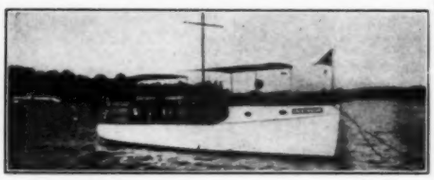
No. 355—21 ft. runabout. Speed 12-14 miles. Price attractive. Harry W. Sanford, 501-5th Ave., N. Y. City.

No. 590—For Sale. 25 ft. runabout. Speed 22 miles. Very good condition. Harry W. Sanford, 501-5th Ave., N. Y. City.

No. 602—For Sale. 53 ft. Twin screw power yacht sleeping 8 persons. Perfect condition. Harry W. Sanford, 501-5th Ave., N. Y. City.

Cabin Cruiser "Chevalier." Fine seaboat. Lines by R. M. Haddock. 38 ft. 10 in. x 9 ft. x 30 in. draft. 6 in. x 12 in. oak keel. 2 in. oak frames. 1¼ in. cedar planking. Copper riveted. Mahogany trim. Forward deck 8 ft., afterdeck 6 ft., cabin 14 ft. (sleeps four), cockpit 11 ft. A. P. B. A. rating 46.80. Speed 9 miles. 4 cyl. engine, 24 h.p. silent exhaust. 70 gal. water tank. Two 65 gal. gas tanks. $2000. L. H. Parke, Bay Head, N. J.



FOR SALE—36 ft. x 8 ft. x 2½ ft. Bridge Deck Cruiser. 4 cyl. 4 cycle engine. Speed 8 miles. Sleeps 5. Fully found. A high class boat. Price low. H. M. Poole, 1715 84th St., Brooklyn, N. Y.

75 H.P. triple expansion Marine engine. Steam engine for sale. A Bargain. North Star Boat Line, Ortonville, Minn.

FOR SALE—30 by 6 V-bottom runabout. 40 H.P. Valve in head motor, electric starting and lighting system, full automobile type control, automatic bailer, clock, revolution indicator, rear hand starter, double ignition system. Speed 16 miles per hour. $600 for immediate sale. Address X Z, care of MoToR BoatinG.

FOR SALE—36-ft. mahogany runabout designed by Wm. Gardner. Engine Wisconsin 40-50 H.P. with auto wheel and control. Rayfield carburetor, Bosch dual ignition; Hyde propellor. Two auto seats behind windshield; two arm chairs and cross seat in stern. Full equipment including auto top with side curtains, windshield, etc. Dry and seaworthy. T. Kilpatrick, 86 Kent Avenue, Brooklyn.

BARGAINS.

Each year we offer a few bargains in motor boats. This year our list is the smallest we have ever presented, but what we offer is quite worth while.

W. A cruiser of great excellence. Fitted with every convenience. Remarkably well found. Ample accommodations for eight and crew. Extra spacious deck room. Able in any weather. Speed 13 miles. (53' x 11'10" x 3'2".)

X. A runabout, V-bottom (24 ft. 10 in. x 5 ft. 4 in. x 2 ft. 3 in.), designed by a leading Naval Architect. Powered with Sterling Engine. Speed about 19 M.P.H. Extremely good sea boat.

Y. A runabout, Dory style (25 x 6 x 1½). A sturdy, safe boat, powered with Grant Ferris Engine. Speed about 12 M.P.H. fine rough water boat.

CONODOGUINET CONSTRUCTION CO., Carlisle, Pa.

FOR SALE—A YACHT OWNER'S HOME. A very attractive summer home, situated on Black Rock Harbor, with a most beautiful view of Long Island Sound. This Home is built of granite blocks for the first floor, second floor shingled. Large windows and plenty of light and fresh air, city water, steam heat, gas and electric lighting, granite sea walls and fences, stone pier and yacht landing and best of anchorage. One large garage built of brick will hold 2 cars, work shop and place over head for help.

This home would make any yachtsman WAKE UP and take notice. For further particulars inquire of Wm. S. Brandegee, Agt., 2-4 Seabright Ave., Bridgeport, Conn.

OPEN FOR BIDS AND INSPECTION

FOR SALE—Buffalo, two H.P., four cycle, two cylinder, Marine motor, with all necessary attachments, all in first class condition. $35.00 will take it. L. D. Huber, 204 State Street, Saint Joseph, Mich.

FOR SALE—Flying Eagle hull, 16 ft. x 4 ft., mahogany, brass screw fastened, powered with 18-25 Pierce-Budd motor, Bosch magneto, safety rear starter, starter coil and Joes gear, built by Apel and launched last July. Speed 30 miles. Will be sold cheap before overhauling. Apply W. Palmer, 153 Franklin St., Brooklyn.

Racine Runabout Motor Boat, 19 ft. long, 18 M.P.H., 16 H.P. Pierce-Budd engine; Special Cushions; Mohair Top; Full Equipment. Just overhauled and ready for water. Guaranteed. Correspond with S. J. Glunt, 631 5th St., Huntington, W. Va.

FOR SALE—Raised deck cruiser "Whoopla," 25 x 7 x 2½—two cylinder four cycle 10 H.P. Frisbie Engine. Magneto and battery ignition—auxiliary sail—Fish-well under cockpit floor. Complete with anchor, cushions, etc. $450.00. Can be seen at yard of Essex Marine Railway, Essex, Conn. E. H. Cooper, New Britain, Conn.

WANTED—Boat builders, cabinet makers, joiners, and good first-class house carpenters. Our shops are sanitary, well ventilated, steam heated and the working quarters are excellent. Port Clinton is located on the shore of Lake Erie, midway between Toledo and Cleveland, on the main line of the New York Central Railroad. Non-union shop. We offer good wages, steady work, and transportation will be refunded. Write us if you want a good job, with good pay. Matthews Boat Co., Port Clinton, Ohio.

Splendid opportunity to buy a well established boat business on a well known Wisconsin Lake, at a bargain. Repairing, livery and storage. Also automobile repairing, livery and storage. Near Chicago. No competition. Includes property, buildings, machinery, boats, Ford auto, etc. For details address MoToR BoatinG.

FOR SALE—One four cycle, make and break, heavy duty, one cylinder, 6 H.P. One two cycle, three cylinder, 18 H.P. rebored new pistons. One two cycle, one cylinder, 4 H.P. rebored new piston. Carburetors with all, have no use for this; have taken them for work, bargain to dealers. Allentown Experimental Work, Allentown, Pa.

MISSOURI Motor Single Cylinder, 4 Cycle, 4 H.P. Complete equipment. Lovett yacht stove. Bargains. Wm. T. Jenkins, Quincy, Ill.

For new and second hand marine engines write American Motor Manufacturing Co., Stillwater, Minn., manufacturers of the celebrated Campbell marine engines.

FOR SALE—Two-cylinder, two-cycle 16 h.p. Miamis motor with Joes reverse gear. Motor in good condition. Reverse gear new last summer. Inquire Colonial Boat Shop, 140th Street and Hudson River, N. Y. City.

WANTED—10 ft. tender finished bright; Battery charger and switch-board. Address C. Claude Scull, 1103 Atlantic Ave., Atlantic City, N. J.

Selling More Marine Supplies

It is only reasonable that the dealer who carries a complete stock of well selected marine supplies will sell a greater annual volume than the dealer who has only a small assortment and cannot fill every order promptly. For the same reason the dealer who is best informed on boats, engines, marine accessories and boating developments will do the best business in his locality.

We believe that both pleasure and commercial boating are only in their infancy. In spite of tremendous strides in the past few years, the business to come is greater than the present facilities of the industry could take care of. The final link of the chain of distribution—the retail outlets of the trade—should be made ready for these increased demands.

If you are a dealer write, telling the line or lines of marine products you now handle. We want to help you to handle more.

MoToR BoatinG

119 West 40th Street **New York City**

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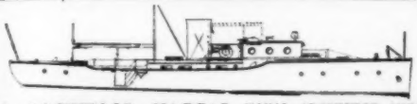
Thomas D. Bowes, M. E.
NAVAL ARCHITECT AND ENGINEER
Offices:
Lafayette Bldg., Chestnut and Fifth Sts.
PHILADELPHIA, PA.

COX & STEVENS
Engineers and Naval Architects
Yacht Brokers
15 WILLIAM STREET, NEW YORK CITY
TELEPHONE 1375 BROAD



E. LOCKWOOD HAGGAS NAVAL ARCHITECT AND CONSULTING ENGINEER
The Designing of Yachts, Motor Boats and Commercial Vessels a Specialty. Construction Supervised.
618 DREXEL BUILDING, PHILADELPHIA, PA.

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Write for 48-page illustrated catalog

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YACHT BROKER
501 FIFTH AVE., at 42nd St., N.Y.
Desirable yachts of all types for sale and charter
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110-Ft. Yacht "CONSUELO"
Sixteen Years
Designing Experience
Specialty
Seagoing Yachts
J. Murray Watts, N. A.
328 Chestnut St. Philadelphia

BRUNS, KIMBALL & CO., Inc.
115 Liberty Street New York City
Offer over 200 re-built engines, backed by a stict guarantee, at especially attractive prices. List will be sent free for the asking. Your present engine will be taken in part payment for a new Sterling, Kermath, Gray-Prior, Doman, Missouri, Universal, 4 cycle; Eagle, Hartford and Arrow, 2 cycle; Missouri heavy oil engines, simple and economical. Burnoil, heavy duty 4 cycle heavy oil engines, quick starting, economical, easy to operate. Write for offer.

Get a MOHAWK
It will prove the best engine investment you ever made
S. & R. MFG. CO.
Ingersoll Ave. Schenectady, N. Y.

Spring Axioms

(*Continued from page 11*)

paint seems also to be the rule. To burn off the old pigment without injuring the canvas is a difficult and tedious task, and the use of liquid remover is very expensive.

The logical way to remove the paint on is to let the natural wear and tear do it for you. In other words, only enough paint should be applied to prevent the weave of the fabric from becoming too prominent.

If the wear is uneven, paint such spots or portions that have suffered the most and later give the whole deck a thin coat. There are seasons when a deck will require nothing more than a vigorous scrubbing with soap and water.

A freshly painted deck after a couple of weeks' exposure seldom looks much better than the unpainted one which has been thoroughly cleansed.

Let us consider for a moment the question of the brightwork. Here is where more labor is wastefully expended perhaps than on any other part of the boat.

To restore the wood is a bothersome and sometimes ticklish job, necessitating many functions. The old varnish must first be thoroughly removed and if it is oak you are tackling undoubtedly it is badly stained. This means that a bleach must be applied, and next an application given to neutralize the acidity.

Then it's the elbow grease with sand paper.

At about this time the threatened shower has driven you to cover, and very likely on the following Sunday you will have to start all over again. Finally the first coat of varnish goes on to be followed by perhaps two more, and you let it go at that; but it is soon discovered that the elements, principally the dew, have gotten in their fine work and then the job is ruined. If, however, the brightwork is given even a very small amount of care, after having once been put in proper condition, it will be found unnecessary to restore it except at very infrequent intervals. We know of an instance where a boat was used for four seasons without refinishing the brightwork and although the wood became slightly darker as time went on, it always remained fresh and clean. Part of the varnished portions consisted of oak waterways, a quality of wood and a location which is more difficult to keep bright than perhaps any other.

Painting the interior of the boat along the keel and up into the bilges, a job taking time and care to accomplish, is another quite unnecessary duty although usually considered as being very important. Not only is it impossible to do the job properly without removing all of the flooring as well as the engine, but the danger of obstructing the limber holes is a consideration as well. The benefits claimed are threefold, viz: to sweeten the bilge, to lessen the absorption of water, and to prevent decay. As to the first, a boat would not be a boat unless the bilge had its characteristic odor, and it would seem that those to whom this condition is distasteful had inadvertently taken up the wrong hobby. As to the second, a boat is bound to absorb its proportion of water, paint or no paint. An example of this is in the case of your rowboat. Undoubtedly you paint it both inside and out each Spring, for a craft of this nature should be so treated, and when it is put overboard no great effort is expended; yet to heave it out in the fall requires some beef.

As to decay, a boat with a painted bilge in the old sailboat days was regarded with a feeling of suspicion, for the expression regarding paint and putty covering a multitude of sins was well heeded then. The possibility of the motor boatman losing his craft due to its rotting away is remote indeed. Many an owner believes his ship will answer the purpose for the rest of his life (it satisfying him now in every particular) and while this is a characteristic delusion noticeable among boatmen, in reality that same craft will soon be found deficient in some respect and then steps are taken to replace it. The writer feels he is qualified to speak with some authority on this particular subject for his present boat is the seventh during a period of twenty-four years. This represents an ownership of approximately four years to each boat; not far from the usual batting average in this respect. It is true that many a man retains his craft very much longer, but on the other hand there are those who have a new boat each year.

Now, after our boat has been made spick and span, why not spend a few minutes each week in making such minor repairs as may seem necessary? To accomplish this is simple enough, but very few plan accordingly; and it may be safe to say that the main reason for this is directly traceable to the paint brush. To clean a brush is a nuisance especially when on shipboard; and so, when once the painting and varnishing are done, the brushes are usually either washed out and put away for use the following season; or they are allowed to dry and harden, thus becoming useless without entailing additional labor and expense to restore them.

The natural wear and tear on a boat will cause bruises, scratches and dents, no matter how careful one may be; and with the necessity of varnishing the brightwork, that is exposed to dew and rain at least once a month, the brushes as well as the paint and varnish should be kept handy at all times. Such spots needing paint require, as a rule, simply a brushful; therefore, the smallest variety will answer. To clean is merely a matter of first wiping the bristles with a rag and then washing out with a few drops of turpentine—an operation which may be accomplished in a few seconds.

The varnish brush, which should be of fair size, need not be washed out, but may be suspended in a mixture of linseed oil and turpentine. When the brush is immersed the bristles should not touch the bottom, but should be supported by means of a wire running through a hole, bored in the handle, which should be in line with the top of the container. This latter may be an old tomato can, or the like, and it is well to have several of them aboard for use in varnishing, washing out brushes, mixing paint, etc. When the brush is to be used, it is a simple matter to first wipe off the excess oil and turpentine on the inside of the rim of the can, and brush out the remainder on the bottom over one of the lockers or under the deck. As both turpentine and linseed oil are used in making varnish, one need not be so very particular about freeing the brush of this mixture before commencing work.

A simple way of cleaning the large brushes, whether used for paint or varnish, is first to cut the oil by washing them out in a fairly strong solution of soap-powder and hot water, and then by using either benzine or turpentine as a final cleanser. This job may be done to good advantage at home, but have a care lest you muss up the kitchen sink, as the cook may start something in the way of a brush herself.

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Practical Navigation for the Motor Boatman

(*Continued from page* 14)

rection for different apparent altitudes. Observations should be avoided when the altitude is less than 12° or 15°, because of the uncertainty of the correction at low altitudes. Parallax is the correction due to the observer being stationed on the earth's surface and not in the theoretically ideal location at the earth's center. Table 16 of Bowditch gives the sun's correction for parallax at different apparent altitudes, the correction being additive. Table 20B gives corrections for refraction and parallax combined and is therefore more convenient than tables 20A and 16. The combined corrections for refraction and parallax are subtractive. Table 21 "Correction of mean refraction for the height of the barometer" and similar tables are not used in ordinary navigation.

The idea of combining corrections has been carried much further than table 20B. Table 46 of Bowditch gives a combined correction for semi-diameter, dip, refraction, and parallax for observations of the sun's lower limb; and dip, and refraction for stars. The table begins on page 922. Along the tops of the pages are column headings for different heights of eye. Under each height of eye there are two subheadings, the left hand one designating corrections for the sun and the right hand one corrections for stars. The sun's corrections are additive and the star's corrections subtractive. A column on the extreme left hand side of each page gives the observed altitudes to which the corrections are to be applied. To use the table for correcting an observed altitude of the sun's lower limb, turn to the page having the proper height of eye as a column heading. Take from the column headed "Sun's Corr. (+)" the correction which lies in the same horizontal line as the figure in the observed altitude column which is nearest to the actual value of the observed altitude. A further correction to this correction must be made by adding or subtracting, as the case may be, the number of seconds indicated by the little table of "Additional corrections for the sun's alt.," found at the foot of the pages. It will be found most convenient to combine the index correction of the sextant with the correction as found above and apply the resulting single correction to the observed altitude, rather than to apply the two corrections independently. Problem 1 illustrates this method of correcting an observed altitude and shows how closely it checks the more laborious method of applying all the corrections separately. In modern practical navigation table 46 is used in every case where it applies. The table does not apply to sights of the sun's upper limb, to sights of planets, and sights of the moon. The corrections for the observed altitudes of stars are taken from the columns of "Star's Corrections" in table 46, the star's corrections are subtractive and must not be modified by the little table of "Additional corrections for the sun's altitude" at the foot of the pages. Further examples of the correction of altitudes will be found in the latitude sights worked in this article.

Observations for latitude may be solved by purely rule of thumb methods, but as it seems that the principles behind the simple rules for working latitude should be understood by even the most practical of rule of thumb men, they will be explained here. Because it simplifies the conception of things pertaining to nautical astronomy all heavenly bodies are considered to be attached to the inside of an immense imaginary globe which surrounds the earth and is an infinite distance from it; or in other words the "celestial sphere," as it is called, is of infinite radius. The celestial sphere is supposed to rotate about an axis which is a prolongation of the earth's axis; there is consequently a celestial North pole directly over the earth's North pole, a celestial South pole over the South pole, and a celestial equator directly over the equator. The so-called fixed stars are practically permanently fixed onto the inner surface of the celestial sphere while the sun, moon, and planets travel on the sphere's surface in definite paths. The reader must remember that all this imaginary condition of affairs is unreal, but it is nevertheless used because it helps the navigator to get a clear conception of the problems he is to solve.

The celestial sphere is divided up into hemispheres, etc., in much the same way as the earth is. Celestial latitude is called declination and like terrestrial latitude is simply the distance of an object from the equator in angular measure. The equivalent of longitude on the celestial sphere is called "right ascension" and will not be dealt with further until star sights for longitude are taken up. Figure 4 is a simple diagram of the celestial sphere. The reader should note on this diagram that the latitude of any point on the earth is equal to the declination of the point on the celestial sphere which is directly above it. The point directly over an observer is called his zenith, or merely the zenith, and the angular distance of a heavenly body from the zenith is called the zenith distance. The reader should bear in mind that the zenith is the point that happens to be directly over the observer's head and is not a point whose position on the celestial sphere is fixed like the celestial North pole or South pole. Ten different observers in ten different locations on the earth would have as many different zeniths, but in every case it would be true that the latitude of the observer is equal to the declination of his zenith. The reader should study diagram 4 until he has convinced himself of the universal truth of this statement. When a body is observed "on the meridian," that is when it bears due north or south of the observer, the latitude can be calculated from the corrected altitude and the declination of the body without the use of trigonometry, only the addition and subtraction of angles being necessary. Figure 5 shows a number of the simple sketches made by some navigators to show how the latitude, or declination of the zenith, is obtained from the altitude of the observed body above the theoretical horizon, and the declination of the observed body. In practice the declination of the sun or other body used in taking a sight is obtained from the nautical almanac.

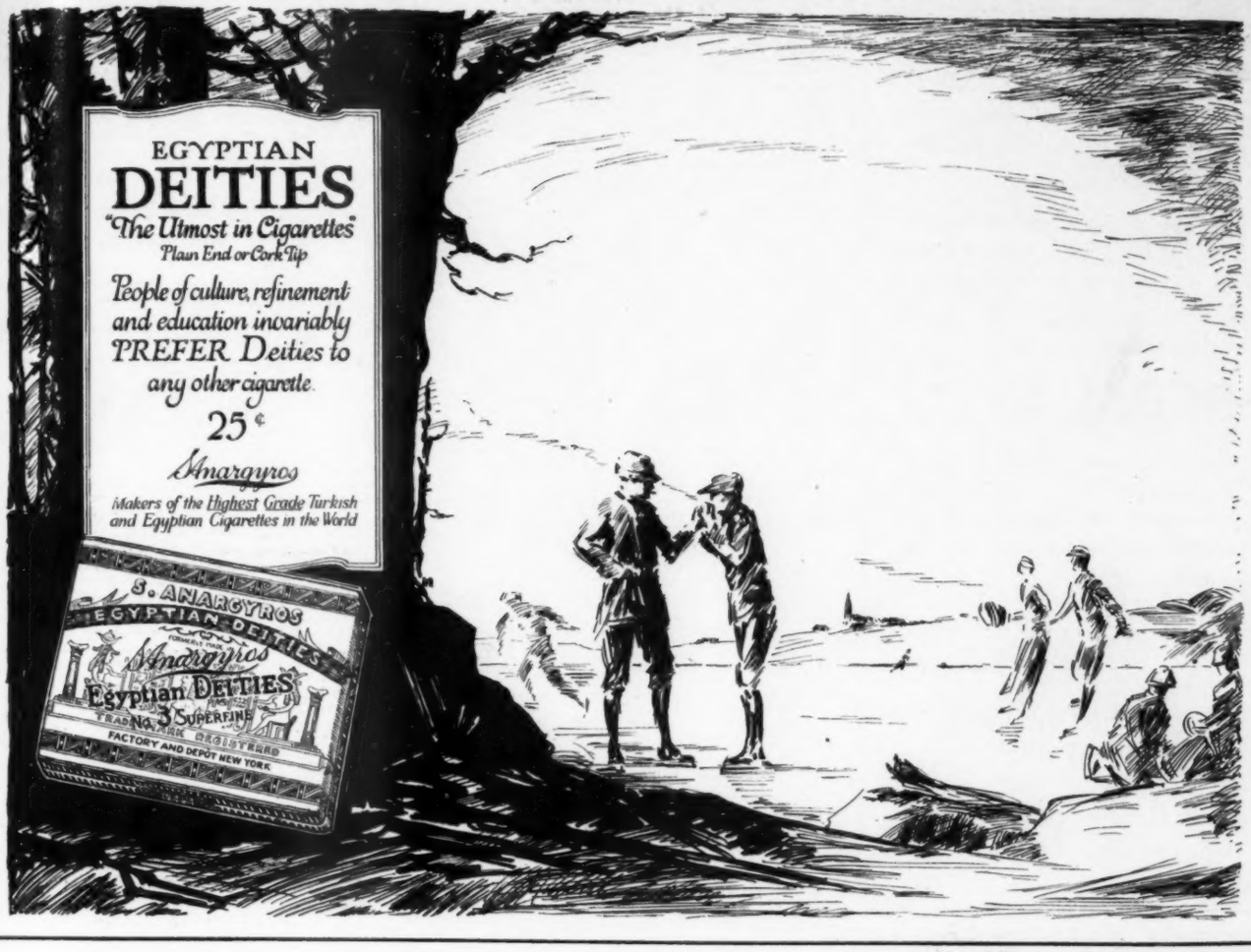
The nautical almanac is a sort of astronomical time table giving the declinations of the sun and other useful heavenly bodies at different times of day for each day in the year. The reader is doubtless aware that at a given instant of time the times at New York, Chicago, San Francisco, and London are different, so for the purposes of nautical astronomy it is necessary to arbitrarily choose some time as standard and tabulate the data for that time. All data in the American Nautical Almanac are tabulated for the mean astronomical time and date at Greenwich, England. Greenwich astronomical dates are specified because the astronomer's day does not begin at midnight as does the civil day, but begins at noon. The astronomer also avoids the complication of a. m. and p. m. times by having the hours of his day numbered from one to twenty-four consecutively. Three o'clock in the afternoon, or 3:00 p. m., April 18, 1918, becomes $3^h\ 00^m$ April 18 to the astronomer, while 2:00 a. m., April 19, 1918, becomes $14^h\ 00^m$ April 18. At first it seems that turning civil into astronomical time and date would be puzzling, but this is not the case because it is merely necessary to remember that when the time is p. m. the astronomical date is the same as the civil date and the astronomical time in hours the same as the p. m. time, and that if the time is a. m. the astronomical date is a day earlier than the civil date and the time 12 hours greater than the civil time. A puzzling thing about time is the difference between apparent time and mean time. This difference is due to the elliptical orbit of the earth which causes the sun to appear to go round the earth a little faster at some times of the year than at others. As long as the world used sun dials as time pieces this slight irregularity of the sun's apparent motion passed unnoticed, but good clocks called attention to the fact that the sun did not "run regularly" and hence caused the adoption of what is called mean time for civil purposes. Mean time is the time that would be kept by a sun which made the same number of apparent trips round the earth in a year that the real sun takes, but that ran at a uniform speed instead of at a varying speed. Clocks keep mean time. The device of a fictitious sun which keeps mean time is used a good deal to simplify some of the computations in advanced nautical astronomy, the fictitious sun is called the mean sun, and the difference between its time (mean time or clock time) and apparent time as indicated by the real sun is called the equation of time. The value of the equation of time at each even hour of the Greenwich mean astronomical day is tabulated alongside the declination of the sun in the nautical almanac.

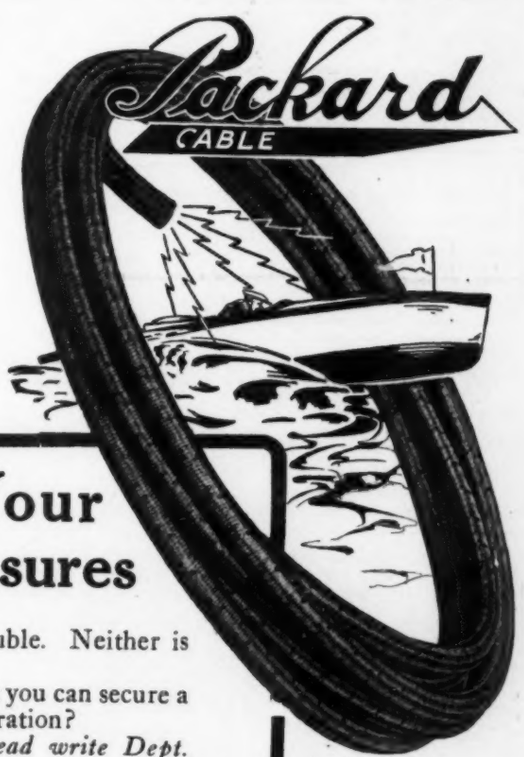
A page from the 1918 nautical almanac is reproduced in figure 6. The left hand columns headed G.M.T. are the even hours of Greenwich astronomical mean time for each day. The declination of the sun in degrees, minutes, and tenths of minutes is tabulated for each even hour of the day, and the equation of time in minutes, seconds, and tenths of seconds is given for the same time instants. A plus sign in front of a declination shows that the declination is a northern one, or that the sun is north of the equator. This plus sign does not necessarily mean that the declination is to be added to any other quantity in making computations, the plus sign means North and nothing else. A plus sign in front of an equation of time means that the equation is to be added to mean time to get apparent time, and conversely it must be subtracted from apparent time to get mean time from it. Mistakes can be avoided by frequently noting the rule printed at the foot of every page in this table:—"The equation of time is to be applied to the Greenwich mean time in accordance with the sign as given." At the foot of the column of hours for each day are printed the letters "H.D.," which stand for hourly difference. In the declination and equation of time columns the rate at which these quantities change value are printed opposite the letters H.D. The hourly differences for the declination column are in minutes and tenths of minutes per hour, and for the equation of time column are in seconds and tenths of seconds per hour. Whether the declination and equation of time are increasing or decreasing as the day progresses must be determined by inspection of the tables. Problem 2 illustrates the use of the nautical almanac.

The working of latitude by meridian altitude of the sun is done by taking a sight and determining the altitude of the sun and combining this altitude after correction with the sun's declination as found from the nautical almanac. The rules for combining the altitude and declination may be reasoned out by means of sketches such as are shown in figure 5, or the combination of the values may be affected "by rule" as long as the sight is not one of the midnight sun in high latitudes. The rule for working meridian altitudes will be stated after the method of finding the Greenwich mean time and date at which the sight was taken has been explained.

In order to use the nautical almanac for finding the sun's declination it is necessary to know the Greenwich mean time and date. It is simple to do this when the information is wanted in connection with the working of a meridian altitude of the sun, because such sights are always made when the sun is on the meridian, or in other words, at local apparent noon. The longitude of a ship is always approximately known by dead reckoning. Longitude is difference of time between a place and Greenwich as well as the angular distance a place is East or West of Greenwich. The sun apparently travels round the world in 24 hours, it therefore travels $360° \div 24 = 15°$ each hour and similarly it travels 15′ each minute. To convert difference of longitude into time it is necessary to divide the longitude in degrees, minutes, and seconds, by fifteen or to use table 7 on page 641 of Bowditch. This table is fully explained on page 508 of Bowditch and the explanation will not be

(*Continued on page* 82)





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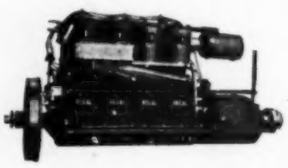

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Is Your Motor Ready?

(*Continued from page 22*)

otherwise it will not reach the bearing surfaces. Oil circulating pumps should be taken apart and thoroughly cleaned.

One thing sure to cause trouble in a marine motor is a failure in the supply of water for the cooling system. The rotor of a rotary pump, no matter whether of the gear, vane or centrifugal type, wears away very rapidly and will not work properly, if at all, unless it fits snugly into the casing. Plunger pumps should have the packing renewed.

In putting timing gears or valve gears back in place be sure the match-marks are really matched. A difference of only one tooth in setting the gears will often mean the difference between a smooth-running, flexible motor and one that is balky and hard to control.

Valve timing is too large a subject to be discussed here, but it is generally hard to improve on the timing, as the manufacturer originally set it. This applies to both magneto and valves.

When overhauling the motor don't forget the reverse gear. Hardly a season passes but when on some occasion the safety of your boat, and even yourself, depends upon the unfailing action of this piece of machinery. It is well to dismantle the gear and clean the parts in the same manner as the motor, using kerosene to remove all the old grease and oil. If any parts show signs of wear replace them now. If you do not the chances are that you will forget them until they "let go" at some critical time.

The best results are obtained by using the grade of grease or oil that the manufacturer designed it for. In adjusting a clutch some men make the mistake of tightening it up to the limit. This is liable to cause breakage of the smaller parts and is bound to cause more wear on the moving parts. With some gears it is positively dangerous, as they will fail by breaking parts in the first emergency when the lever is not handled carefully.

To get the best results the adjustment should be such that the gear will just transmit the full engine power without slippage. This will avoid unnecessary strain on the parts, and should the propeller wheel strike driftwood, the bottom or other obstructions, the gear will slip and avoid a damaged wheel or shaft nine times out of ten.

If a paste made of white lead and powdered graphite is used on the threads of the spark plugs, threaded fittings and pipe joints, they will make up tight and stay tight, yet should you want to take them down they will not stick. Some people use ordinary graphite stove blacking for this, but the white lead mixture makes a tighter joint.

In replacing the water connections for the motor see that the hose is in good condition. This often softens from the oil about the motor, and should there be a slight obstruction at the intake connection the hose is liable to collapse and shut off the supply of water entirely.

As a rule, it is the little things—apparently insignificant details—that should be looked after if you want your motor to give you good, reliable service. Don't try makeshifts to save a few minutes time or a little expense. If parts are worn replace them before they give out entirely. More trouble can be traced to nuts and bolts working loose from vibration than any other cause. Use lock washers and cotter pins wherever possible.

When overhauling the power plant or the steering gear remember that the most severe strains always come in an emergency or during bad weather.

Motor Boats Assume a Martial Mien

(*Continued from page 28*)

Works, at Red Bank, N. J.

The boat Concrete now being used extensively for publicity purposes by the Portland Cement Association was on display the last two days of the show. It had been transported from Chicago on a Garford truck and was delayed by the heavy snow storms and bad roads encountered on the way. Of course, this boat is not representative of the concrete boat building industry, and was displayed merely as an oddity rather than as a new discovery. It will be admitted, however, that under direction of a capable naval architect a practical craft might be produced of this substance.

Said to be one of the most interesting features of the Show was the motion picture exhibition on the mezzanine floor, in which especially made marine films were shown by MOTOR BOATING. Over 8,000 feet of film were used to bring the leading engine and accessory factories to the show, as it were, for these films gave a most comprehensive idea of the making of motors and boats. Among the films shown were views of the world-famous British submarine chasers, pictures of engine building operations in every stage, accessory manufactures, the making of a magazine and showing other activities in which the motor boat takes part. MOTOR BOATING'S booth was always easily located by the new arrival who had been told to look for the crowd.

With practically the whole world at war, the usefulness of the motor boat as an arm of defense is greatly exemplified at this year's exhibition and the public is shown what the industry is doing to help in this time of stress and strain.

Ten Degrees North

(*Continued from page 16*)

are numerous derricks and enormous storage tanks, while a pipe line leads from them to the end of the pier, where the oil is pumped into tank steamers for shipment.

Everywhere in this part of the gulf petroleum may be seen bubbling up from the bottom to the surface of the water, while the pebbles on the beaches, the reefs below the sea, the outcropping ridges on the shores and many of the cliffs are all of asphalt. No doubt at some future time the Pitch Lake may be exhausted, but there is a similar deposit across the gulf in Venezuela, and there is enough of the material in Trinidad alone to provide good roads for all the world for countless years to come. Beyond La Brea the coast is less attractive, for the land grows low and flat toward the southern end of the gulf, but ashore there is good hunting and there are many out-of-the-way and uninhabited coves and lagoons where one may fish, hunt and laze to one's heart's content.

Time will never pall upon the visitor to Trinidad who has a motor boat at his disposal, for months may be spent in exploring the seventy-odd miles of the island's shores alone, weeks may be spent enjoyably in some favored spot and from localities easily reached by motor boat excursions may be made into the scenic wonderland of Trinidad's interior.

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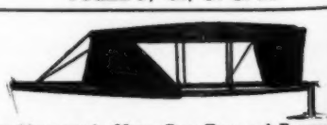
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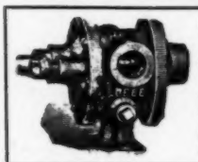
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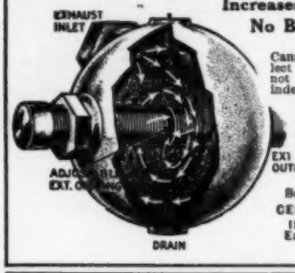
IMPROVED THERMEX SILENCER

Increases Revolutions, No Back Pressure!



Cannot clog, nor collect salt; water cannot flow back to cylinder. No heating, no odor. Used free or under water — adjustable discharge. Lightest, cheapest to install. Free booklet shows why.

Send for it to-day.

CENTRAL MFG. CO.
155 Liverpool St.,
East Boston, Mass.

POLARINE

The Standard Oil For All Motors

Standard Oil Co. of New York

W. & J. TIEBOUT

MARINE HARDWARE

Hardware for Steamers, Yachts, Motor Boats. Brass Goods a Specialty.

118 CHAMBERS ST. NEW YORK CITY

BANTAM BALL BEARING CO.

BANTAM, CONN. U.S.A.

STANDARD OIL ENGINE

SEMI-DIESEL

A strictly heavy duty engine, for tow boats, freight boats, auxiliaries and large cruisers.
4 Cycle—8 to 250 H. P.—One to Six Cylinders
Write for further details.

STANDARD OIL ENGINE COMPANY
Woolworth Building New York City, U. S. A.
Works: Bridgeport, Conn.

MOTOR PERFECTION

is what you get in Watkins Class Ball Iron Motors. Especially fine for canoes and light boats. Constant and efficient.

3 H. P., single cylinder .... 45 lbs.
6 H. P., double cylinder ... 85 lbs.
12 H. P., four cylinder .....155 lbs.

Are light, at the same time strong; accomplished by using semi-steel castings, high carbon steel shaft, bronze bearings, high class workmanship.

THE WATKINS MOTOR CO., 828 W. 6th St., Cincinnati, O.

A RARE SPORT

Simple, Speedy, No Vibration

Makes your canoe a fast power boat—The KOBAN is strictly a canoe motor—Opposed cylinders remove vibration—weighs only 65 lbs.—occupies little space—moderate price. Ask for Circular 80.

Koban Mfg. Co., Milwaukee, Wis. **246 Barclay St.**

KOBAN CANOE MOTOR

W & M REVERSING WHEELS
Guarantee Speed, Strength, Control. Catalog Free

Wilmarth & Morman Co.
1189 Monroe Ave. Grand Rapids, Mich.

Yacht Upholstery

Furnishings, draperies and bedding. We solicit inquiries from naval architects, builders and owners. Estimates without charge.

WYCOMBE CO. Inc., 317-23 East 34th St. New York City

Telephone: Murray Hill 5319

ANDERSON REGOODENGINES

2½ to 100 H.P.

Write for Particulars.

Anderson Engine Co., 4032 N. Rockwell St., Chicago

Fairbanks Co., Broome and Lafayette Sts., New York
Pacific Marine Eng. Co., 76 Marion St., Seattle, Wash.

The New Van Blerck Eight

(*Continued from page 32*)

crankcase is also of semi-steel, and is designed with ample size ribs to assure a rigid support for the cylinders.

Chrome nickel steel is used for the connecting rods, wrist pins and crankshaft. The connecting rods are drop-forged and fitted with vanadium steel bolts at the crank pin end. The crankshaft is also drop-forged with the counterbalance weights electrically welded to the cranks.

The oiling system consists of a pressure pump in the sump at the forward end of the base, delivering the oil into steel tubes, cast integrally with the base, that lead to all the bearings and the reverse gear. The surplus oil collects at the after end of the base, where the oil-return pump returns it to the sump, passing through the oil cooler on the way.

The regular equipment includes a two-unit 24-volt Leece-Neville starter and generator, Willard storage battery, Berling twin-spark magneto, Schebler carburetor, Delco high-tension battery ignition and a Van Blerck-Paragon reverse gear.

All moving parts are enclosed, including the flywheel, but the parts are readily accessible for adjustment. Large handhole plates are provided on the starboard side of the base and an extra large inspection cover on the reverse gear housing.

Yard and Shop

(*Continued from page 44*)

California. She is 51 feet long with a beam of 10 feet and has a speed of 24 m.p.h. The accompanying illustration was taken at Catalina Island while the stellar owner was gazing over the side, possibly figuring out how he was going to land on that bank. Those who have seen this Farnum boy in action will have no doubt as to his capabilities for getting there. This popular star not only acts strenuous parts but lives them in the great out-of-doors, acquiring the health and vim that are associated with such living.

Ding is a recent acquisition, having been built for the season of 1917 in the yards of Fellows and Stewart, of Wilmington, Pa. She is powered with twin Model F six-cylinder Sterlings, totalling 290 h.p. The motors have a bore of 5½ inches and a stroke of 6¾ inches and incorporate the counterbalanced crankshaft, which is the feature of these motors.

Ding can easily accommodate six and eight persons on extended cruises and cover distance with a rate of speed comparable to the average express, while, of course, the expense is much less and the convenience more. She is used as a means of transportation to the various scenic locations as well as for racing, hunting, etc.

Zenda, a 43-Foot Patrol Boat

One of the patrol boats promptly acquired by the Navy after inspection is the Zenda, property of Francis E. Eaton, of Boston. The craft is but 43 feet long with a beam of 9 feet 4 inches, bordering close on the limits, but has such excellent qualities that she was accepted with alacrity.

Zenda is controlled from the bridge deck by her owner and is but another example of the tendency of modern motor boats to surpass any other mode of travel. The motor is one of the counterbalanced crankshaft Sterlings, a FH four-cylinder 25-55 h.p. engine with a bore of 5½ inches and a stroke of 6¾ inches.

The motor is so arranged that it may be started from the bridge and there is a generator driven by the motor powerful enough to furnish all the lights required for both interior and running. The speed is 13 m.p.h.

Zenda is one of the standard Lawley designs, which are extremely popular with boatmen who occasionally like a dash of spray.

Casco System for Replacing Motor Boat Top Coverings

The frame of the motor boat top should last for years—barring accidents—but the roof may need recovering at any time. This copyrighted patent-applied measuring system, furnished by the Cincinnati Auto Specialty Co., of Cincinnati, O., will save more than one-half the cost of a new top. They have been building automobile top coverings for years by this system and have saved a great deal of money for motor owners, and now offer the same opportunity to owners of motor boats.

They have carefully studied the requirements of motor boat equipment and guarantee satisfaction. This company is offering only materials which they know are specially adapted for this particular use, and the chart they supply makes it easy to secure a perfect fit.

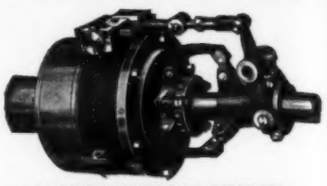
As a rule, when a motor boat top is in bad condition the roof and back curtain only need to be replaced. For that reason the Cincinnati Auto Specialty Company quote prices on all parts separately, so the top may be replaced as cheaply as possible.

Top recoverings come completely finished with all necessary tacks, welts, and brass eyelets and brass fasteners. Any one that can drive a tack can attach the Casco motor boat top recoverings. Full instructions accompany each recovering, so there can be no difficulty in attaching it. For the small effort of driving a few tacks the top may be put in perfect condition with small expense.

Previous Coupon Regulations Repealed

In view of the President's executive order of January 26, 1918, which requires holders of coupons of foreign account to obtain certain certificates from the Federal Reserve Board and otherwise conform to its regulations, the War Trade Board has revoked its former rulings, which authorized the collection of coupons due on or before January 1, 1918, for foreign individuals, firms and corporations, without obtaining licenses from the War Trade Board or authority from the Federal Reserve Board.

(*Continued on page 62*)



MANUFACTURED IN SIZES TO MEET ALL REQUIREMENTS
Also One Way Clutches

NAVY GEAR COMPANY
JOE PETRELLI, General Manager
NEW HAVEN :: CONN.

20 Foot Special Dory.
The safest little sea boat built, will stand the ocean waters.

CAPE COD POWER DORY CO.
Worcham, Mass.

The standardized boats circular on each:
24 Cabin Cruiser, 16 ft. Shallow Draft.
Lake and River Boat.
17 ft. Sail Boat.
17 ft. Life Saver, Row Boats.
14 ft. for outboard motor.

ELECTRIC SEARCHLIGHTS

We make searchlights in sizes from 7 in. to 60 in. diameter, suitable for small launches and yachts and for the largest battleships. Send for Catalog A.

THE CARLISLE & FINCH CO.
261 E. Clifton Ave., Cincinnati, Ohio

MARINE EQUIPMENT

CONNECTICUT

IGNITION—IGNITION CONTROLS
LIGHTING EQUIPMENT AND LIGHTING CONTROLS

CONNECTICUT TELEPHONE & ELECTRIC COMPANY
Meriden, Conn.

CROCKETT'S

Spar Composition

—the original and best known exterior marine varnish in the world. The best Interior Finish is Crockett's

No. 1 Preservative

Send for Catalogue

The David B. Crockett Co. Bridgeport, Conn.

HYDE BOAT & ENGINE CO.
Rowing and Power Tenders. Dories and Runabouts built to order. Outboard and Inboard Motors. "The Best for Power, Pleasure and Price." Kenny Absolute Silencers. Send for Engine catalog.

Phone Cort. 1979 **186 Greench St.** **New York**

1917 JOYMOTOR

MORE POWER——LIGHTER WEIGHT

Reversing Propeller—Underwater Exhaust

The best ever for outings, fishing, hunting, vacations
Write today for particulars and agency proposition

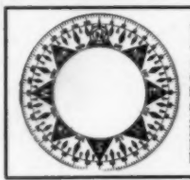
JOYMOTOR MFG. CO. McCormick Bldg. Dept. 16 Chicago

FOR YOUR BOAT

Degrak

Better than Varnish, Shellac or Lacquer for Every Purpose. Write for free sample.

KEYSTONE VARNISH COMPANY
2975 Keystone Bldg Brooklyn, N. Y.

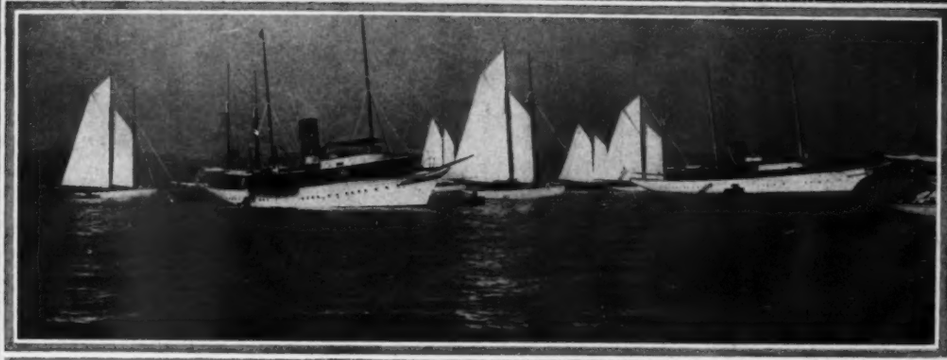


Nautical Instruments

underlighted Compasses, Course Protractors, Bearing Finders. Every navigator should have them. Send for interesting catalogue. Address Box 45, Marine Compass Company, Bryantville, Mass.

THERE'S SAFETY AFLOAT WITH PYRENE IN THE BOAT.

Pyrene
KILLS FIRE
SAVES LIFE



DURABILITY. The extraordinarily strong, pliable surface of Leatherwove is one of the chief reasons why it is the ideal Boat Upholstery.

To withstand the elements and the severe use put to Boat Upholstery, Leatherwove is especially adapted—it is weatherproof—no rotting or blistering—can be easily cleaned—sanitary—and above all sturdy and long wearing.

Scores of distinctive patterns and unique color combinations.

CHASE

Leatherwove

"Tis like the hide in most respects
In some respects 'tis better"

Made by Sanford Mills

APPEARANCE. If Boat Upholstery should be durable, it likewise should be smart-appearing. Leatherwove will enhance the beauty of any boat. Manufacturers wishing to add an impressive touch to their finished output ought to use Leatherwove for the upholstery—Leatherwove delights the eye—is beautifully finished and distinctive.

Write for samples—plain black to quaint Spanish effects.

Leaders in Manufacturing Since 1847

L. C. CHASE & CO., BOSTON

New York Detroit Chicago

Leatherwove is used by our Government

Cell-Beam Concealed Searchlight

A Midget in size; a giant in power. The lamp of a thousand uses for the motor boat.
Price $5.00 complete.

CELL-BEAM MANUFACTURING CO.
1101 BEDFORD AVE. BROOKLYN, N. Y.

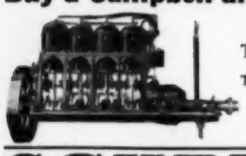
Sootless THE BRASS PLUG $1.25
The Aristocrat of Spark Plugs
COST MORE TO BUILD
Gives You Enduring Quality
IT PAYS TO GET THE BEST
OAKES & DOW - BOSTON
NO PORCELAIN TO BREAK.

SKF
BALL BEARINGS
SKF BALL BEARING CO
HARTFORD - CONN

VALLEY BOATS

from stock or built to your order.
An improved 3529 Double Cabin Cruiser ready for delivery.
VALLEY BOAT CO.
River St.
Saginaw, Mich, U. S. A.

Buy a Campbell and Keep Going



Sizes 5 to 60 H. P.
The Engine of Accessibility
THE WATER CRAFT CO.
221 Fulton Street
New York
General Distributors

SCHEBLER
CARBURETOR
Standard of the World
Consistent Winner of Motor Boat Races
THE WHEELER-SCHEBLER CARBURETOR CO., Inc.
INDIANAPOLIS, U. S. A.

LEECE-NEVILLE
ELECTRIC STARTING-LIGHTING SYSTEM

OUTFITS OF QUALITY

AUTOMOBILES

MOTOR BOATS

MANUFACTURED BY
THE LEECE-NEVILLE COMPANY
CLEVELAND, OHIO

Yard and Shop

(*Continued from page 60*)

Send Catalog for the Lyon Fair

The following letter, relative to the starting of a propaganda for the sale of motor boats in Lyon, France, and that vicinity, from the American Consul, J. E. Jones, will be of interest to manufacturers in the motor boating industry:

Lyon, December 29, 1917.

MoToR BoatinG,
119 West 40th Street,
New York City.

Gentlemen:

This is in acknowledgment of your letter of the 7th instant, in which you advise the sending of two numbers of the December issue of your very interesting journal. Be sure, in accordance with your request, I shall place these at the disposition of the public during the next Lyon Sample Fair, and do all in my power to interest the purchasing public in MoToR BoatinG.

While I feel it would be asking too much of the manufacturers of motor boats to make a display at this Fair, I believe it would be most advantageous, as soon as the war is over, for the builders of motor boats to exhibit at the Annual Sample Fairs at Lyon, France. While motor boats are used to a small extent both on the Rhône and on the Saône, the time is not far distant when they will be generally used both for pleasure and profit.

There are several big propositions now under consideration to deepen the Rhône, so as to make it navigable from Lake Geneva to the Mediterranean Sea. Nothing definite has been decided upon. But this proposition of making Lyon an internal seaport will surely be crowned with success within a few years, and I do not think it too early to start a propaganda for the sale of motor boats in this vicinity.

Please advise, through the medium of your journal, the importance of manufacturers in supplying catalogues for the Lyon Fair. This year I shall have a large display and I want as many catalogues as possible.

You understand, of course, no charge is made for this display, and translations and information generally is furnished gratuitously by my Consulate.

With all good wishes, and assuring you of my hearty co-operation, believe me,

Very respectfully yours,
J. E. JONES,
American Consul.

New York Agent for the Joes Reverse Gear

The Snow and Petrelli Mfg. Company have appointed Sutter Bros., of 30 Church St., New York City, sole distributors of their Joes high-powered and duplex-drive reversing gears, rear starters, etc., for Greater New York, Long Island and the cities of Jersey City and Newark, N. J. Sutter Bros. will not only maintain an office and show room at 30 Church St., but have a well-equipped service station at Canarsie, foot of 92nd St., Brooklyn.

They offer their advice and services free for the adjustment of the Snow and Petrelli devices, if brought to their service station, and are in a position to overhaul and make all repairs at short notice and reasonable prices.

More Boats to Fight Submarines

(*Continued from page 9*)

Speed in hunting the subs, while essentially desirable, is not nearly so important a factor as stability for guns and ability to stay out at sea for indefinite periods. The 110s fall short of both of these requirements. The other important consideration is great numbers, which can be obtained with the smaller wooden boats but is lacking in a destroyer program. Thus the new turbine-driven craft, which are a cross between a destroyer and a chaser, and with the production methods planned would be the most effective weapon we have yet sent against the Hun.

Furthermore, with the coming of the newer methods of warfare against the undersea craft, the depth charge and similar devices, stability for large guns becomes less and less important, which up to now has been one of the greatest disadvantages of the small chaser.

Safety in the Air

(*Continued from page 37*)

able to actually control the airplane—it maintains the machine in any desired position, level or otherwise, in which it is capable of flying safely, holding it steady against all opposing force.

This automatic pilot is sufficiently successful to be specified on some of the Government planes. It will doubtless prove of great military value by stabilizing the airplane while the pilot attends to the duties incident to warfare.

It is claimed that the automatic pilot will find its greatest usefulness on the large machines of great power, building and to be built. On such large planes the pilot is subjected to great physical and mental fatigue, which it is believed the automatic pilot will greatly relieve.

On at least one occasion the automatic pilot has landed the machine successfully while the human pilot walked to the end of the wing.

Those looking forward to flying their own airplanes or flying boats have cause to thank the army of scientists and practical pilots whose tireless efforts have made it really safe to fly.

PEERLESS ENGINES
"The Engine that Makes Good"
Well designed—carefully built—best materials.
2 Cyl., 5 to 24 H.P. 4 Cyl., 16 to 50 H.P.
All four cycle engines.
PEERLESS MARINE MOTOR CO.
BUFFALO, N. Y. U. S. A.

Pull-U-Out
The little motor with the big pull
For Motor Boats and Yachts
For pulling boats out, hoisting for painting, etc., or lifting engines—it's wonderful. Also pulls autos out of hub deep mud or ditch easily and quickly. Guaranteed. Booklet free.
Consists of winding drum, lever crank, 40 ft. steel cable, two 7 ft. chains, 3 stakes. Fits in 4 x 8 x 14". Weighs only 28 lbs.
PULL-U-OUT SALES COMPANY 939 Olive St. St. Louis, Mo.

AVOID disaster by using a DIRIGO compass on that boat. All materials first class. No rubber gaskets to rot. A very hard pivot and high-grade jewel. Navy degree circle on dial. Brass and mahogany binnacles. Also new course finder and bearings instrument. Send for descriptive catalog.
EUGENE M. SHERMAN
Bay 7 Bellevue, Wash.

AQUATITE
Formerly MARINITE
Is particularly recommended where quick drying qualities are a first consideration. Dries dust free in three to five hours. Will not turn white under water.
EDWARD SMITH & COMPANY
Varnish Makers for 91 Years
CHICAGO NEW YORK

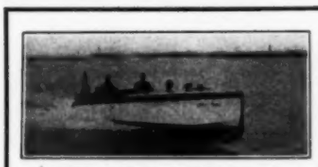
CABINET MAKERS WANTED
Familiar with boat and similar construction
REPLY POST OFFICE BOX 34
CRANFORD NEW JERSEY

LOWEST PRICE BOAT IN THE WORLD

$89 for 15-foot boat finished ready to run, with either inboard or outboard motor.
Builder-Agents Wanted

$25 for complete k. d. boat — oak frame — cypress planking.
Free Catalog—100 Boats
BROOKS MFG. CO.
6303 Ship St., Saginaw, Mich.

BULL-DOG REVERSE GEAR
"The Gear that Hangs on"
Smaller, simpler, lighter, more compact and more accessible than any other gear of its capacity. Enclosed and oil-tight.
4 Sizes—1 to 64 H.P. per 100 R.P.M.
Satisfaction Guaranteed or Money Refunded.
ATLAS MACHINE WORKS
Successors to Kennedy Machine Co.,
797 St. Aubin Ave., Detroit, Mich.



Quality the First Consideration

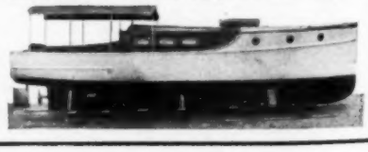
Our 25' special, a V bottom runabout of 5'8" beam is meeting the demand for a good, strong, comfortable boat for the low and medium rather than high powered motors. This makes a strictly high class outfit at a moderate price and running expense low.

Other runabouts from 18' to 30'.

Our cruisers are built to order to meet individual requirements. They embody the best of modern features in either high speed express or more comfortable types.

Anything in the boat line from K. D. to complete outfits.

RICHARDSON BOAT CO., North Tonawanda, N. Y.

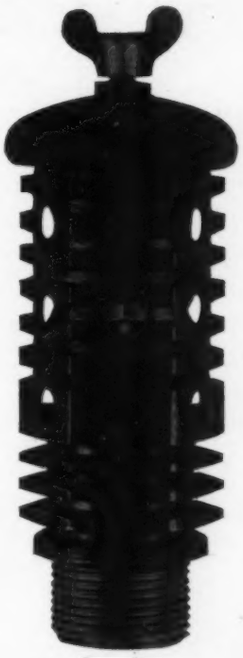


TRADE MARK
DODWILL
AIR-COOLED
SPARK PLUG

The Spark Plug
that's Fundamentally Right

Like The Monitor

of the Civil War, revolutionary in its conception, yet so irresistible in its operation that it turned the tide of defeat, so the Dodwill Air-Cooled Spark Plug is ushered in at a time of national need when all else has failed and proven inefficient —and insufficient for the requirements of present-day motor practice.



Exact Size

Revolutionary in its construction through the entire elimination of porcelain, lock-nuts, gaskets, cement, etc., it is built on the three-point idea—*three points of vital import*—effecting results long sought but never before attained in spark plugs.

Apply them, Mr. Motor User, to *your* conditions.

FIRST POINT

The electrode is wrapped longitudinally with mica and built up to shape by mica washers. It is eternally gripped by nature's method of heat-contraction. Under no conditions can it leak compression, nor rupture.

SECOND POINT

A method of heat distribution that is really effective. The body or shell is one piece of steel, finned and ventilated; the electrode is exposed and provided with a heat distributing radiator. Thus the points are kept 40% to 50% cooler than by subterfuge adaptations.

THIRD POINT

In addition to all the other difficulties of the ordinary spark plug is the trouble with the electrode points. Here's something different—short ball knobs that concentrate the potential into a vigorous, snappy spark. Away with wires that vary in adjustment, and fuse!

The Dodwill Air-Cooled Spark Plug has won the instant approval of many of the leading motor designers and experts who have spoken for practically our entire output. This advertisement is not primarily to *sell* you but to *tell* you that

The Best in Spark Plugs Is Here

If interested we'll tell you more—and gladly

DODD, WILLIAM MFG. CO., Inc.

Office, 9 East 42nd Street FACTORY, NEWARK, N. J. **New York City**

DODWILL AIR-COOLED SPARK PLUG

Which Boat Goes the Fastest and Saves the Most Fuel?

One has a clean, smooth, slippery bottom and is driven at a high rate of speed with the least possible power. The other is heavily penalized with marine growth and a foul bottom—which often costs 50% of its efficiency.

STEARNS-McKAY MFG. CO.
Marblehead, Mass., U. S. A.

JUNIOR PLATTSBURG
Summer Vacation Military Training Camp
JULY and AUGUST
Five Hundred Acre Campus
on Lake Champlain

ARTILLERY INFANTRY CAVALRY NAVAL

Fundamental military training and modern warfare. Conducted by United States Army and Naval officers aided by British, French and Italian officers who have seen service in the present war.

Special Courses in

Automobile assembling, maintenance, starting and ignition; Electrical apparatus, in general repairing and assembling; Ground work of aeroplanes (No flying); War farming and gardening; Food conservation; Sanitary system; Hydroplane; Motor Boats; Telegraph and wireless; Refrigerating; Road-building; Drainage; Civil engineering.

For terms of admission apply

NAVAL SECRETARY, JUNIOR PLATTSBURG
8 West 40th Street, New York City

Any Old Ammeter Won't Do!

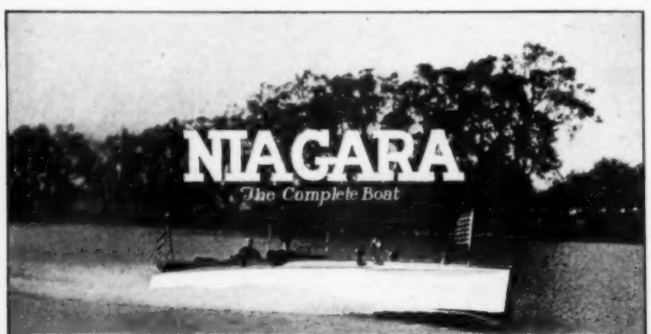
If you think it will, you will change your mind the first time your lights, spark and starter fail without warning, perhaps on a black night far from home.

Weston
Model 301 Ammeter

is dependable. Built by the world's acknowledged leaders in the manufacture of electrical indicating instruments, each Weston Ammeter bears, and must help to maintain an enviable reputation for superiority in accuracy and durability.

Write for full information.

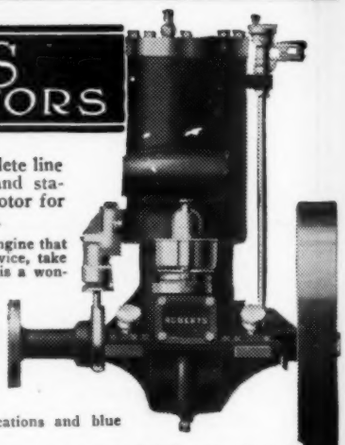
WESTON ELECTRICAL INSTRUMENT CO.
28 Weston Avenue **Newark, N. J.**
23 Branch Offices in the Larger Cities



Combines custom-built luxury with the economy of ready-made production, promptness of delivery and standardization of parts.
Write for literature.
NIAGARA MOTOR BOAT COMPANY, 210 Sweeny Street, N. TONAWANDA, N. Y.

ROBERTS MOTORS

We build a complete line of motors, marine, aircraft and stationary. We have the right motor for your boat at the right price.

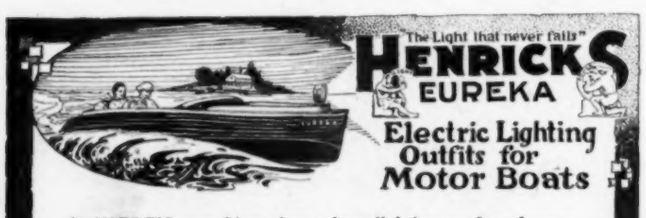


For a Heavy Duty Fisherman's engine that will stand the hardest kind of service, take a look at this Roberts Motor. It is a wonder for power, strength and dependability.

The Bore is 6", stroke 6½", developing 8 H.P. at 300 R.P.M. and 10 H.P. at 400 R.P.M. Operates on either gasoline, kerosene or distillate. Furnished with either Jump Spark or Make-and-Break Ignition.

Write today for prices, specifications and blue prints.

Roberts Motor Mfg. Co. 1205 ROBERTS BUILDING SANDUSKY, OHIO



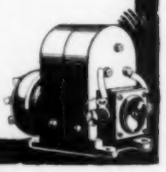
Electric Lighting Outfits for Motor Boats

THERE'S one thing about these lighting outfits of ours; they're built to give you even more service than you expect. They serve a double purpose; light and ignition; both important and both sure with Henricks back of them.

These Outfits must do all that we say they will and be all that the name Henricks stands for: Quality, Service, Economy.

Get our booklet; there's a Henricks outfit made for your boat.

HENRICKS MAGNETO & ELECTRIC CO.
1206 St. Paul St. **Indianapolis, Ind.**



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16, 18, 20 and 24 ft.
Without engine .....$70 and up
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Standard Model $40
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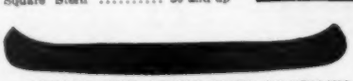

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Please state what kind of boat you are interested in, we can meet your requirements in PRICE, QUALITY and DELIVERY.

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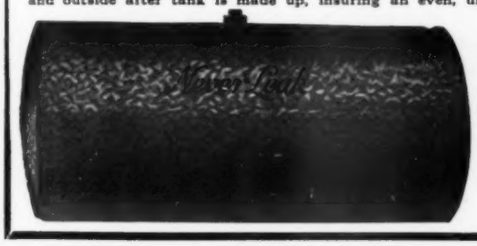

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Get in line with our all-metal adjustable shaftlog and couple up with our double-grip clutch coupling.

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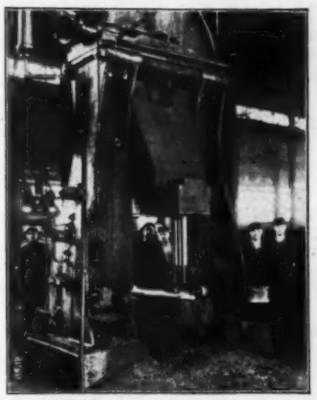

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This invention provides a life preserver garment that may be worn constantly with comfort and convenience, as it does not hamper the wearer in his normal movements, permitting him to pursue his work, while at all times he is prepared for an emergency. An important feature is the collar, which contains sufficient buoyant substance to float the head even though the wearer becomes unconscious. YOU CAN'T DROWN!

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"RED SPOT" SEARCHLIGHT

RED FOR DISTRESS

MOST PRACTICAL MOTOR BOAT SEARCHLIGHT MADE

WHITE FOR SAFETY—for navigating dark and unfamiliar channels, avoiding rocks, picking up buoys, making landings, etc. A powerful penetrating light that carries far and insures safety at night.

RED FOR DISTRESS—simply press a button and produce a brilliant red light that is as effective as red fire for a distress signal and is visible for miles.

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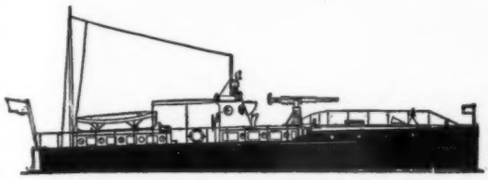

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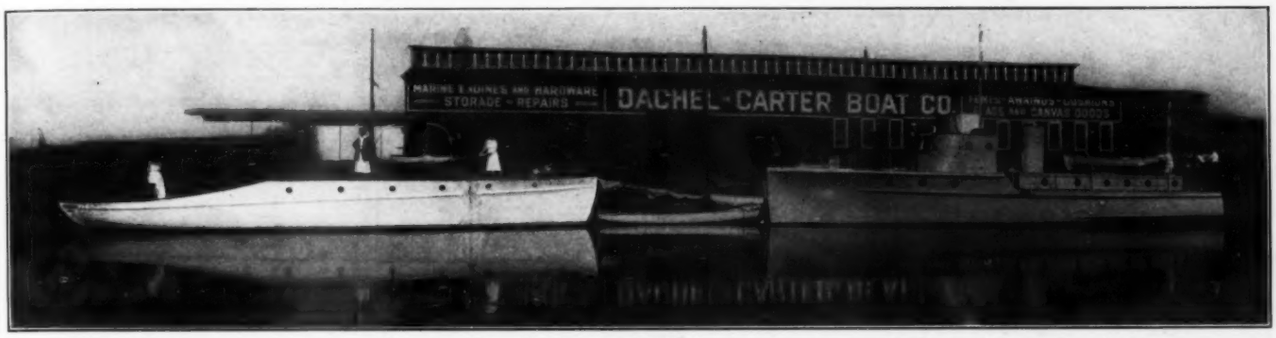

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Figure 1404

Dimensions: 18 x 18 x 11" high to top of bowl; 2 ½" cylinder. For above or below water line.

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All prices subject to market advances, which are continually changing.

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The Curtiss line is exceptionally complete, varied in type, size and price to meet every possible requirement. Each model has been designed in accordance with our wide experience in boat work and can be depended upon in quality, service and durability no matter whether it is our highest or lowest priced model.

With Pump

Lining and Fixtures Nickel-plated. Porcelain Bowl. Mahogany or Quartered Oak Case.

Cock on pump swings upward, thus preventing breaking of bowl. Soap-dish is porcelain and removable.

No. 5
Height, 19 inches.
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Quartered Oak Case, Each...$42.50
Mahogany Case, Each..... 44.00

Fig. 1392

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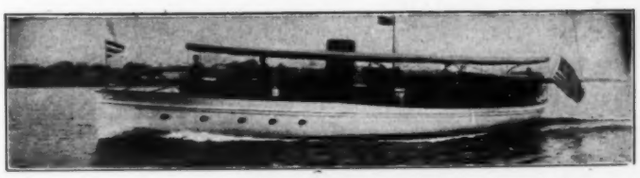
Strictly high grade four-cycle engines, built for heavy duty service.



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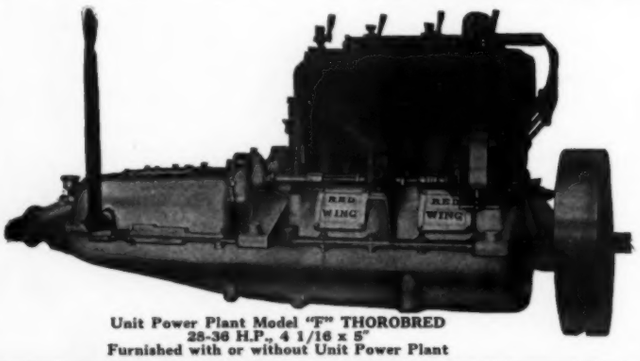
THE MOTOR WITH POWER TO SPARE



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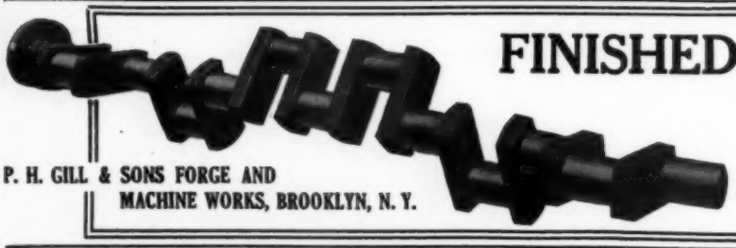

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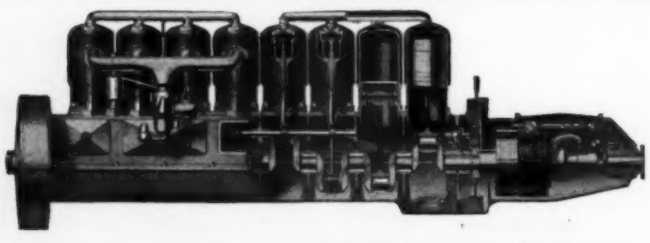

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Dimensions of boat—it is very important to give these:

Length.....ft. Beam.....ft. Draught.....ft.
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IT IS HIGH TIME TO SELECT YOUR MOTOR BOAT FOR THE COMING SEASON

YOU WILL, OF COURSE, WANT A

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MOTOR BOAT

Racine Wis boats are backed by 21 years of boat building skill and experience.

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For Pleasure
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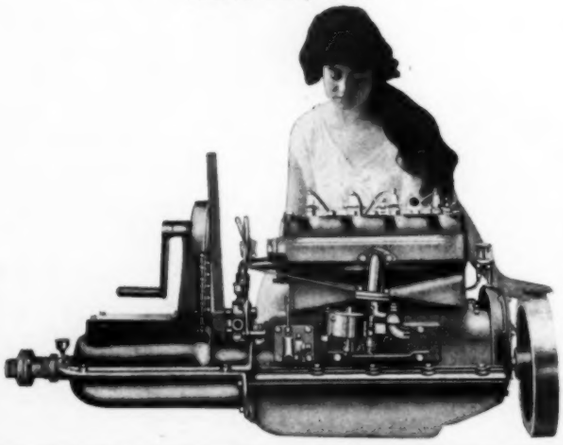

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It is easily attached to any 1" to 3" carburetor.
Will eliminate carbon and greatly

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"HVID ENGINES RUN ON ANY OIL WHICH FLOWS FREELY"

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Absolute reliability in operation.
No preheating or starting on gasoline at any time.
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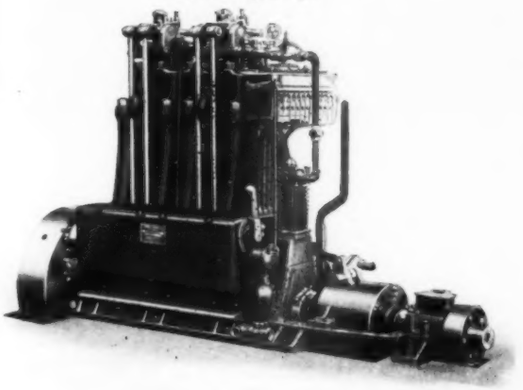
The simplest and most reliable engine built.

Thousands in use now in sizes from 1½ B.H.P. to 100 B.H.P. per cyl.



View showing a 2-cylinder, 20 B.H.P. Hvid Oil Engine as built by the Burnoil Engine Company, South Bend, Ind.

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Canvas that is treated with Preservo remains soft and pliable—it will give double service and is not affected by rain, hail, sleet, or snow—it is inactive to acids, alkalies, salts and salt water.

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3-Cyl.	7½ x 9 "	35-45 H. P.
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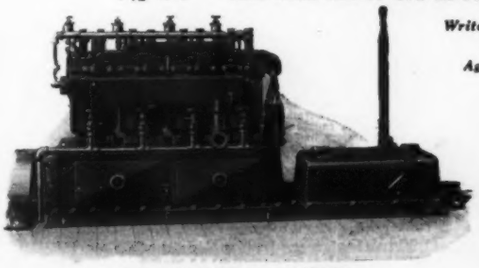

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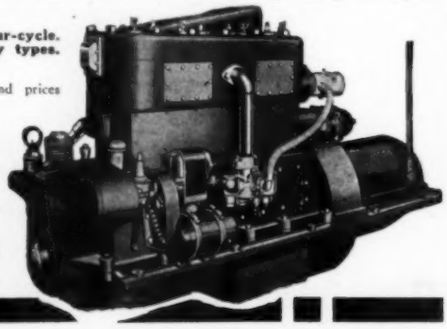

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(Design Patent Applied For)

The "Bow" Closet, Vitro-Adamant Bowl, 2½-in. pump, located at rear, fitted with swing handle. Quick opening supply valve. Space occupied, 15 x 24 in. Pump rough, with finished trimings, oak seat, N. P. Hinges..... $30

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PLATE S-126

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¾ inch	$2.25
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Sizes 2½" and 3" also made.

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(Patented—Copyrighted)

The "Winner" Pump Water Closet, Vitro-Adamant Round Hopper Bowl, oak seat, N. P. brass hinges, 2½" supply and waste pump, "Sands" Special quick opening supply valve.

Plate S-2060 Fixture as described with oak seat..... $24.00

Plate S-2061 Fixture as shown with oak seat and cover..... $25.00

PLATE S-3190

The "Mono 12" Vitro-Adamant Corner Lavatory with N. P. Brass Pump and waste fittings and N. P. Full "S" Trap..... $25.50

Double Acting Brass Auto Bilge Pump. 15 inches long under spout and fitted with 5 feet of rubber hose.

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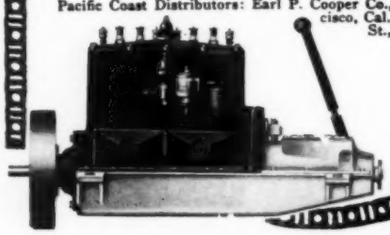

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pump the oil *under pressure* to each wearing point individually. Nothing is left to chance. As long as you can see oil in the sight glass you know that each part is being properly supplied.

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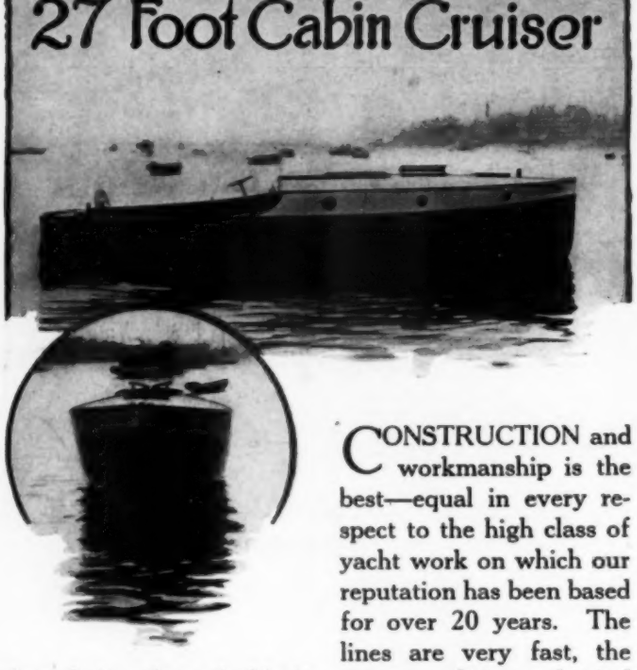

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In every detail of design and construction it is the product of the highest engineering and manufacturing skill.

It has surprising speed, due to the extra power delivered from its two cylinders. The Koban special tilting device makes a hit with fishermen and hunters.

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The light weight of the Koban, its two cylinder design, its simplicity — make it the best rowboat motor on the market. The Koban delivers maximum power from every gallon of gasoline.

"Towed in 26-ft. launch with twelve passengers and trailer carrying four men."—Grand Rapids, Mich.

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MAXIMIZE YOUR EXHAUST

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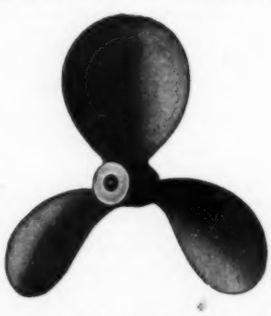

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The "Golden Glow" Incandescent Searchlight projects a powerful light which is very penetrating and therefore more effective for long distance work than any other incandescent searchlight of the same power.

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"Golden Glow" Searchlights are made for all sizes of boats and for any practical voltage or candlepower. USED ON MANY SUBMARINE CHASERS.

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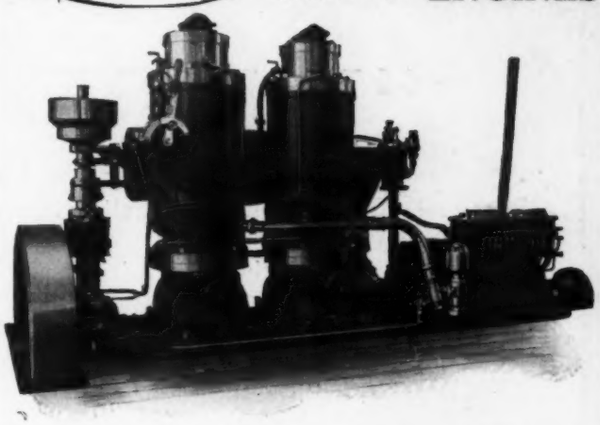

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You carry only one kind of fuel (crude oil) which is used for starting and operating.

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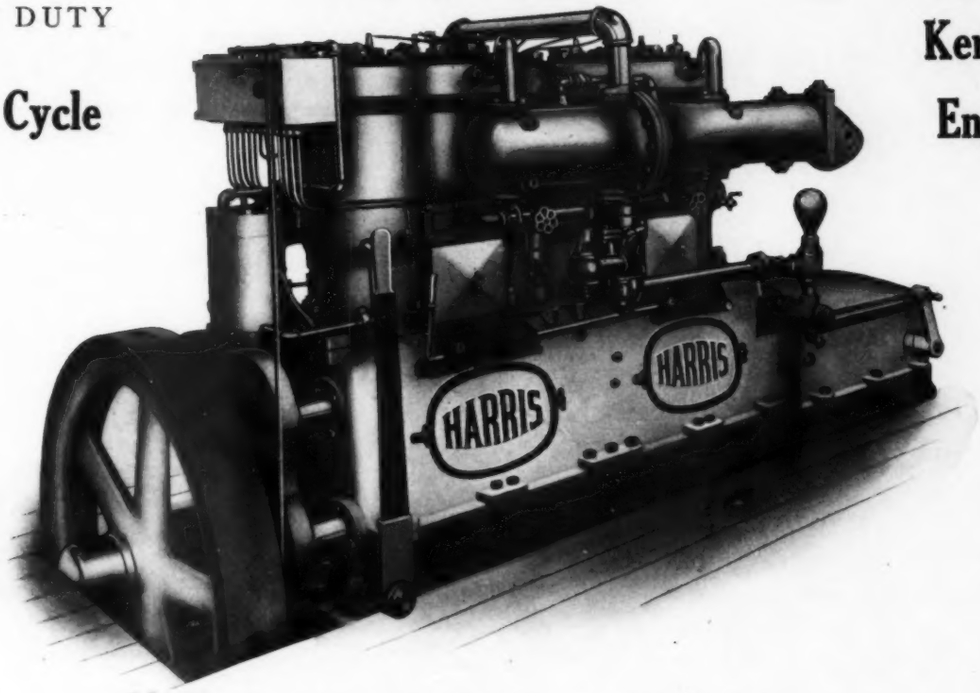

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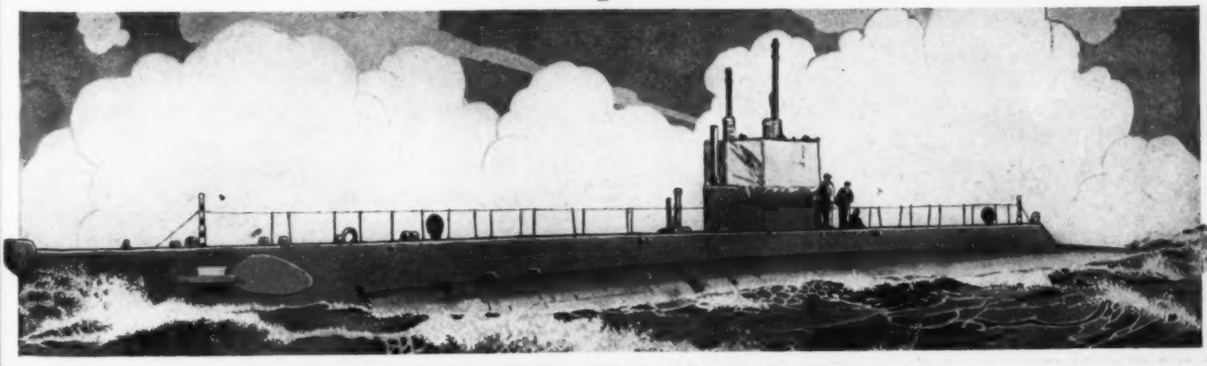

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But we have gone further by backing their quality with such service as only a tremendous organization of specialists could render.

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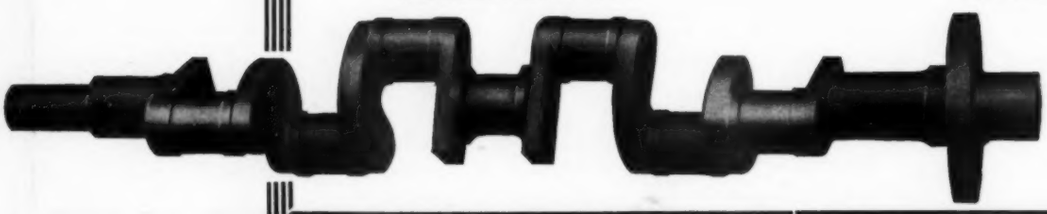
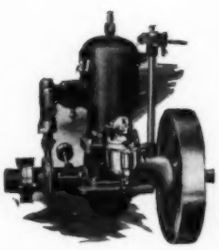


The Why and How of LA 2-Cycle Engines

Why LA 2-Cycle Motors are Economical
How LA Makes a Motor Boat of a Row Boat



Suppose you're going to the lake. Strap an *LA* Row Boat Motor to the running board of your auto; pack it in your camping kit, or take it as baggage.

When you arrive attach it to a row boat and you have a motor boat. The 2-cycle principle makes this handy motor what it is —practically a two-cylinder. Powerful—portable—economical —dependable.

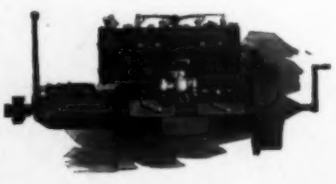
LA Row Boat Motor

Perfect in principle and performance—this is the verdict of engineering experts who have fully tested it. Being of 2-cycle design and without irreversible timing gears, it will run backward as well as forward, therefore a weedless propellor.

LA 2-Cycle Inboard Motors

Two-cycle design gives these motors power ratings practically double 4-cycle design; plus simplicity, lightness, economy and reliability. The single and 2-cylinder models are the ideal small power plants for work or pleasure.

LA 4-Cylinder 4-Cycle Engine



For medium duty in pleasure or work boat—this 4-cylinder 4-cycle (model 44) engine, big brother of the *LA* family. Rugged and dependable.

Ask for the book that tells all about *LA* Marine Engines and all about Lockwood-Ash service. Also about the 30-day trial plan.

LOCKWOOD-ASH MOTOR CO.
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For Working Boats and Heavy Cruisers

GRAY-PRIOR

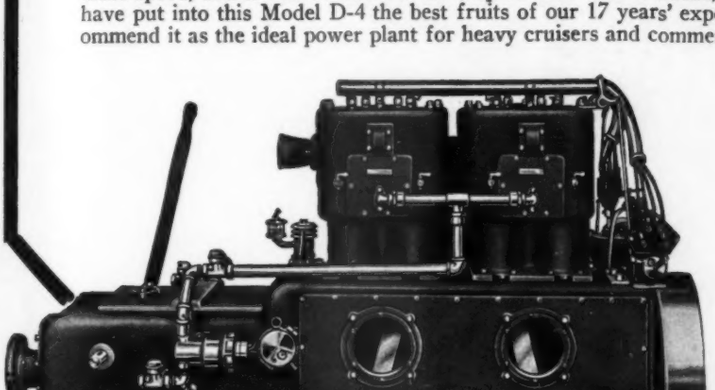
FOUR CYCLE MARINE MOTORS

Built up to a Standard-not down to a price

36 H. P. Medium Heavy Duty

Here is a high grade medium heavy duty, long stroke four cycle motor that will do your work with less expense, bother and trouble than you have ever thought possible. We have not tried to see how cheaply we could build it, but we have tried to see how reliable and efficient we could make it.

This Model D-4 GRAY-PRIOR motor has a bore of 4½ inches, with 8 inch stroke. It develops 36 H.P. at moderate speed, and it will continue to develop 36 H.P. for 10 hours, 100 hours or as long as you happen to need it. We have put into this Model D-4 the best fruits of our 17 years' experience in engine building and can conscientiously recommend it as the ideal power plant for heavy cruisers and commercial boats.



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We also build the famous HARTFORD 2-Cycle Motors. Model X Type. Heavy Duty Type.

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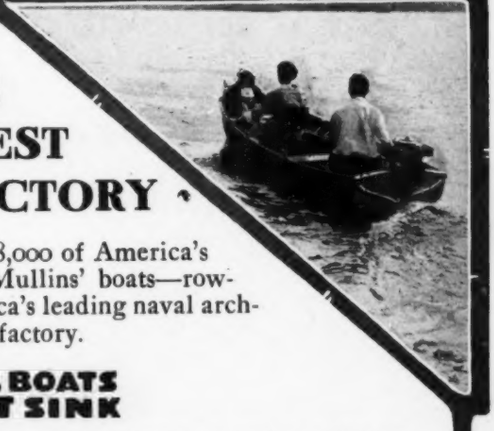

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When boating time comes 'round this year, 68,000 of America's boating enthusiasts will take to the water in Mullins' boats—row-boats, power boats and canoes—designed by America's leading naval architects and built in the world's largest pleasure boat factory.

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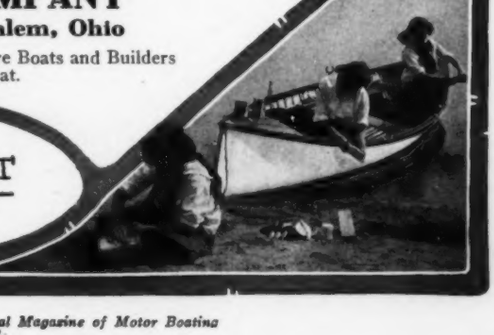

King of Marine Carburetors

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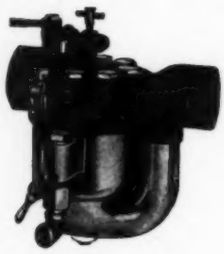
THE WORLD'S MOST POPULAR CARBURETOR



This is the carbu r that will give you the ·· est speed and power of ch your engine and boat are ble. And it will do this on the lo fuel consumption per hour, per horsepo

The Kingston Carburetor is scientifically d ned for modern engines and modern fuel. It is maki good and giving extreme satisfaction on every type of marin ine, automobile, tractor, motor cycle or other kind of gas engi One simple adjustment covers all ranges.

It is the efficiency and popularity of the Kingston Carburetor tha as made us the largest carburetor manufacturers in the world.

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A GUARANTEED 20-mile boat that seats six people comfortably. That is designed by America's best known Naval Architect—John L. Hacker. Furthermore, is built under John L. Hacker's personal supervision. A fast, dry, safe, seaworthy and dependable boat. A standardized boat, completely equipt, built of finest obtainable materials, fitted with all necessary requirements for comfort and safety.

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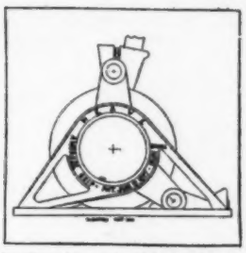

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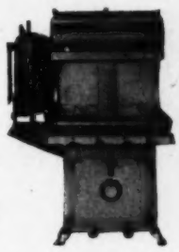

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Because of the fine record on the construction of its quota of 110-foot submarine chasers, the Matthews Boat Co. has been especially complimented by the United States Navy Department. The boats were splendid examples of hull building, and what is more important to the Government and the nation, THEY WERE DELIVERED ON TIME.

To complete in record time, a contract taxing the entire capacity of the plant, is the acid test of a business organization. But speed and efficiency are built into the Matthews business, just as much as the far-famed quality of Matthews Craft.

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Manufactured by

Brooklyn Varnish Mfg. Co.
Brooklyn, N. Y.

"Practical Navigation for the Motor Boatman"

(*Continued from page* 56)

repeated here. The Greenwich mean time of local apparent noon in a certain longitude is found by applying the longitude expressed in hours, minutes, and seconds to the local apparent time (always $0^h\ 0^m\ 0^s$), thus getting the Greenwich apparent time. From this the Greenwich mean time can be obtained by the application of the equation of time. Problem 3 illustrates this as the following problems do also. It should be noted carefully that when the longitude is a Western one the longitude in hours, minutes, and seconds has merely to be added to the local apparent time when the sun is on the meridian ($0^h\ 0^m\ 0^s$) and the result will be the G.A.T. of the meridian passage, but if the longitude is an Easterly one the longitude must be subtracted from $24^h\ 0^m\ 0^s$ and the date set back a day. The reason for this is that when the sun is on the meridian in an Eastern longitude it has not yet reached Greenwich and hence the new Greenwich astronomical day has not yet begun.

When the G.M.T. of the sight has been obtained the declination can be found with little trouble and the latitude can be computed as follows: Subtract the corrected altitude of the sun's center from 90°. The result will be the zenith distance which is to be called South if the sun is North of the observer and North if the sun is South of the observer. If the zenith distance and declination are both North or both South (are of same name) add them together and name the resulting latitude after them both. If the zenith distance and declination are of different name, subtract the lesser from the greater and name the resulting latitude after the greater.

It only now remains to determine when the sun is actually on the meridian and therefore in the correct position for the taking of a meridian altitude. This can be done in two ways. First by observing the sun with the sextant at intervals of a minute or so beginning a few minutes before the expected time of the meridian passage and continuing until the altitudes begin to decrease, when the highest altitude obtained is accepted as the meridian altitude. And secondly, by computing in advance the time by the ship's chronometer and the navigator's watch at which the meridian passage will occur. The first method of waiting until the sun dips was sufficiently described above, and the method is a good one to use on slow ships. On fast vessels it is better to predict the time of the meridian passage and this can be done as follows: Predict the probable rough time of the meridian passage by guess and compute the probable position of the vessel at this time. With this longitude work out as before the G.M.T. of the meridian passage. If the ship's chronometer is fast add the chronometer correction to the G.M.T. and vice-versa, this will give the reading of the ship's chronometer when the sun crosses the meridian. Treat the difference between the chronometer and the navigator's watch the same way, adding if the watch is fast of the chronometer. It generally seems to the beginner that the errors of chronometer and watch have been applied the wrong way in the above proceeding, but a moment's thought will straighten this out. The desired result is what the chronometer will read at local apparent noon. If the chronometer is fast it will naturally read too much, so the correction is to be added. Problem 4 illustrates all this.

Meridian altitudes of stars are worked in exactly the same general way as meridian alitudes of the sun. The observations, however, are difficult to make, both because of the difficulty in getting a star down in the mirror of the sextant and the difficulty of seeing the horizon. The method of predicting the time of the meridian passage of a star will not be taken up until a later article as the problem involves sidereal or star time, which will not be discussed now. The declinations of fixed stars are extremely easy to find. On page 95 of the Nautical Almanac there is a table of these declinations and a glance at the table will show that they remain practically constant throughout the year. The number of degrees in the declination appears only once for the entire year and that in the extreme left hand column of the page. In the other columns are given the additional minutes and tenths for the declination at the first of each month. The rate of change of declination is so slow that it is only necessary to know the date on which a sight was made to work it for latitude. The exact time of the sight is immaterial as far as finding the declination is concerned.

A very good idea of the exact location of a vessel can be had by using the parallel of latitude she is on as a "line of position." A line of position is a line which can be drawn on the chart and upon which the vessel is. The exact location of the vessel may be very indefinite, but she is somewhere on the line. A line of position can always be easily found from a meridian altitude as the line runs due East and West in the latitude found from the sight. A few soundings taken after such a line has been drawn on a coast chart will generally enable the ship to be definitely located. If the soundings fail to give a more definite "fix" of the vessel than was had by dead reckoning and the latitude sight, the line of position can still often be used for finding the way to some desired destination if it is a harbor mouth, a bay, or some such entrance to inland waters. To do this, draw the line of position and note where it cuts the shore line and how far due North or due South of the harbor the line is. If the vessel be now run North or South as the case may be until she is on the latitude of the desired entrance and then be run towards the entrance all the while a good look out being kept and the lead used frequently, land fall can usually be made in safety. In actual practice it is unnecessary to draw the parallels on the chart, but if one problem is solved in this way it will generally fix the principle of the thing in the student's mind, and this principle will later be used in connection with diagonal lines of position obtained from time sights.

NOTE: Lack of space this month prevents the publishing of the problems and examples to go with Part V. These will be published in our April number.

Your dream of the coming season will be happiest, if your boat is Berlingized

—none of the old "mag" trouble!
—fat, steady spark, from a dependable, water-proof magneto.
—no wonder the greatest manufacturers have again adopted the Berling Magneto.

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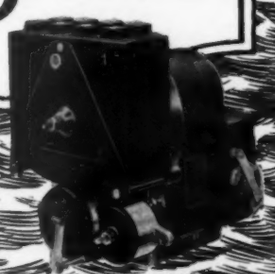

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Does more

Quayle

OIL BURNING
Marine Engines

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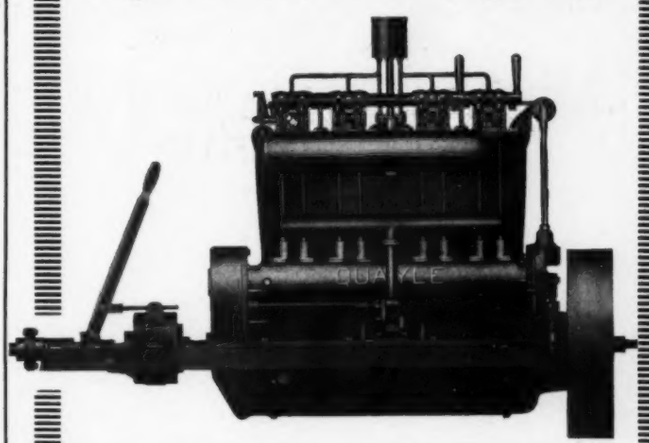
Start-Run on any kind of oil that flows

Saving in fuel alone pays for engine in 300 working days



QUAYLE engines are strictly high grade, with all working parts over size and built for long continuous service. ¶ Fill your tank with 6 cent fuel and cruise twice as far as you could on the same quantity of high priced gasoline. ¶ Positively the most simple, dependable and easy starting motor built to-day.

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Particularly suited for Cruisers, Power Boats, Launches, and the Smaller Commercial Craft.

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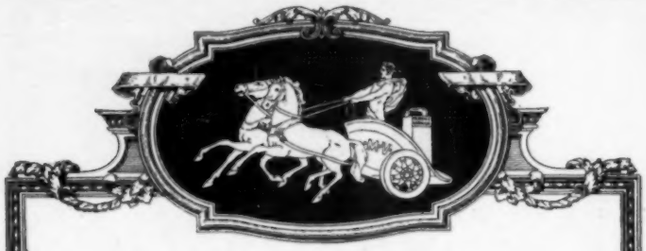

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Its seafaring, sea-fighting qualities have been known to boat-builders for over fifty years. It is tough and elastic and bends with the strain of the boat. It is never soft nor slippery.

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"LUNKENHEIMER Equipped"

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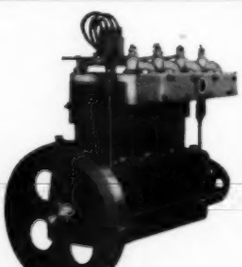
Can be operated on either kerosene or gasolene.

We make a specialty of popular priced motors whose working parts are as well made as the highest priced engines.



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All motors we build are made from our well known designs which embody all the latest ideas in engine construction. They are extremely easy of repair or adjustment. Our motors are in use the world over and we positively guarantee each machine we send out.

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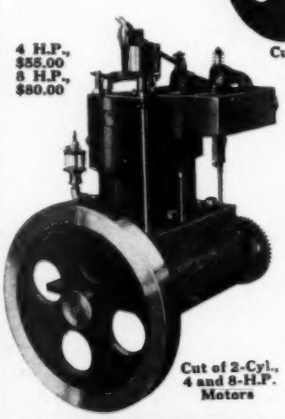
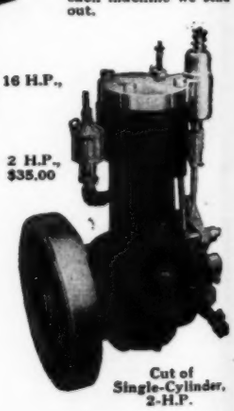
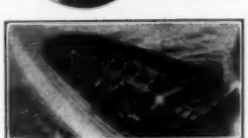


Cut of 2-Cyl., 4 and 8-H.P. Motors

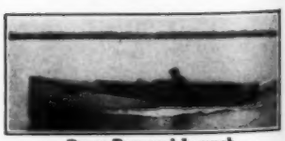
2 H.P., $35.00



Cut of Single-Cylinder, 2-H.P.



An Installation.



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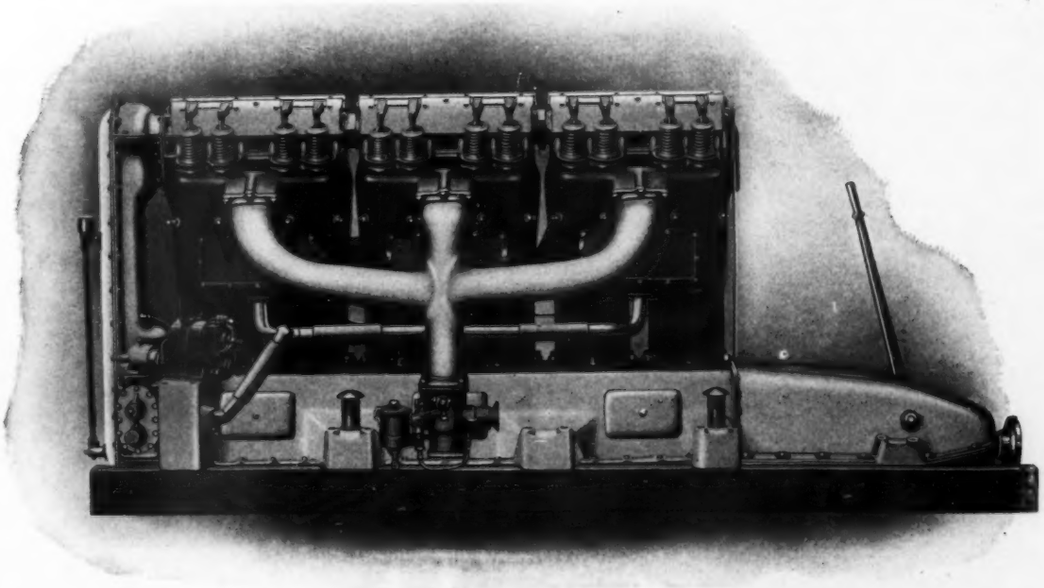
This is accomplished by combining the unparalleled efficiency of the Sea Sled with the high power at low revolutions of this engine.



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Viper Co., Ltd.,
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The Standard is strong, durable and compact—small, light, clean and trouble-proof. It doesn't throw oil because every working part is enclosed in the oil-tight case. It doesn't slip or break because the clutch and gears are a little larger and stronger than the greatest probable strain can overcome. The factor of safety is ample to insure maximum reliability and durability in the hardest kind of service.

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Buck Alaskan Seas For 1600 Miles Without a Stop!

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Was that service? You *bet* it was!

800 Miles in Open Ocean

—with half the run in open ocean, mostly in fiendish weather, it was enough to wreck an ordinary motor. But, "Curlew" and "Frisbie" logged off the miles steady as a clock, on a ration of

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and 3½ gallons of oil for the whole trip. It isn't what a motor *might* do, but what it has done, that counts. Frisbie motors are all *muscle*. Here's one case that proves it, and we could supply numerous others. No man ought to power a boat till he's seen the "Frisbie."

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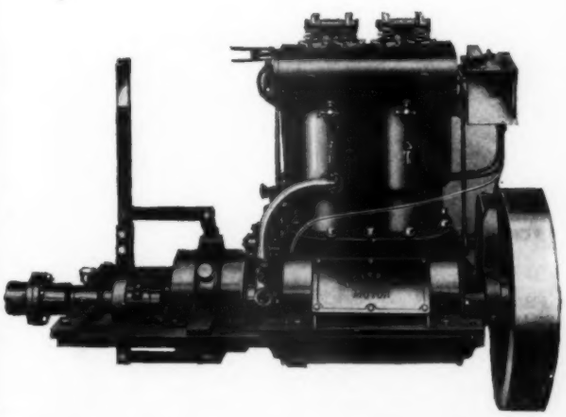

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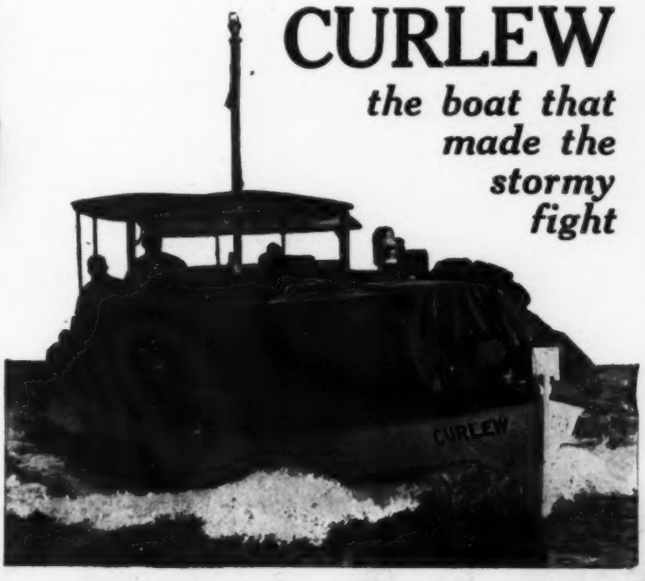
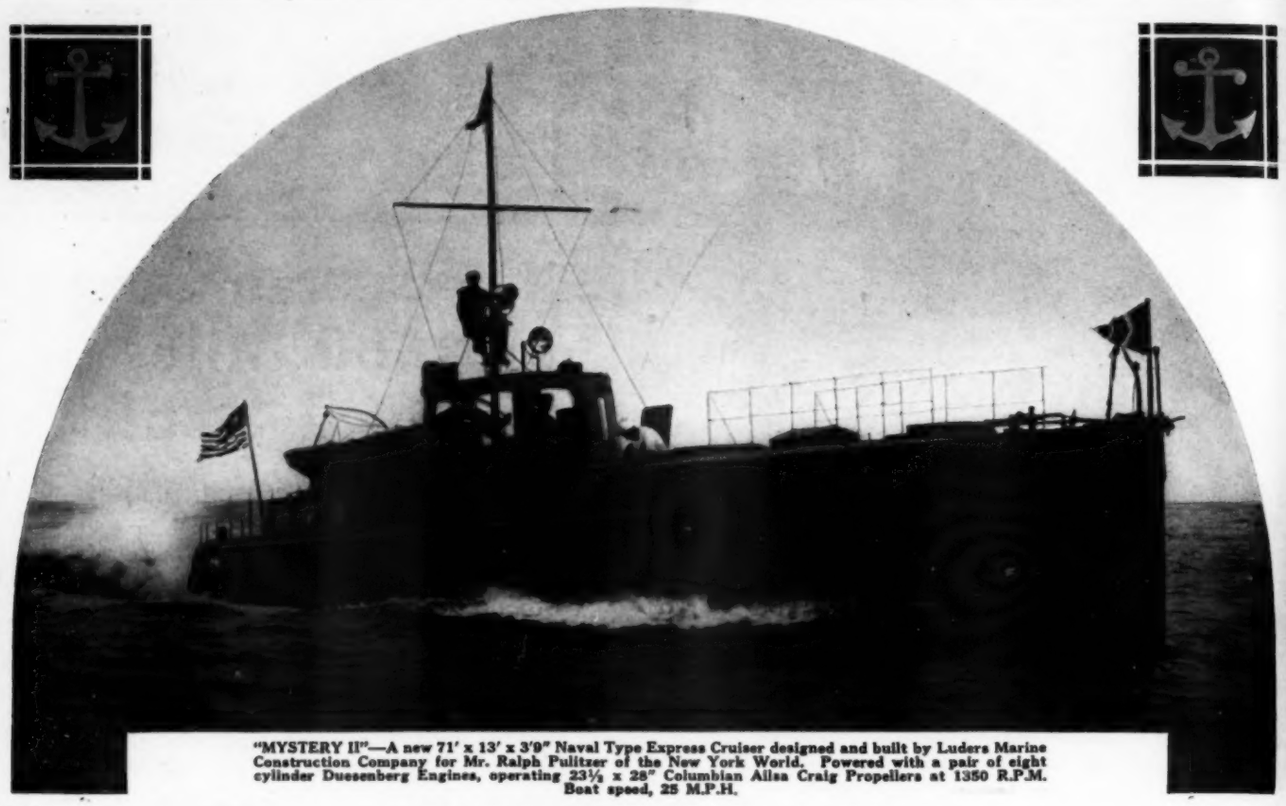
the boat that made the stormy fight





"MYSTERY II"—A new 71' x 13' x 3'9" Naval Type Express Cruiser designed and built by Luders Marine Construction Company for Mr. Ralph Pulitzer of the New York World. Powered with a pair of eight cylinder Duesenberg Engines, operating 23½ x 28" Columbian Ailsa Craig Propellers at 1350 R.P.M. Boat speed, 25 M.P.H.

Copyright Brown & Dawson

COLUMBIAN

Columbian Propellers fit every requirement of the power boat owner. On these two pages you will find illustrations of four distinctly different types of boat, yet the properly designed Columbian Propeller is used in each instance, despite the wide diversity of the speed and working requirements. No matter what your boat may be, there is a Columbian Propeller designed for it, a Columbian Propeller which will give you more speed and better efficiency.

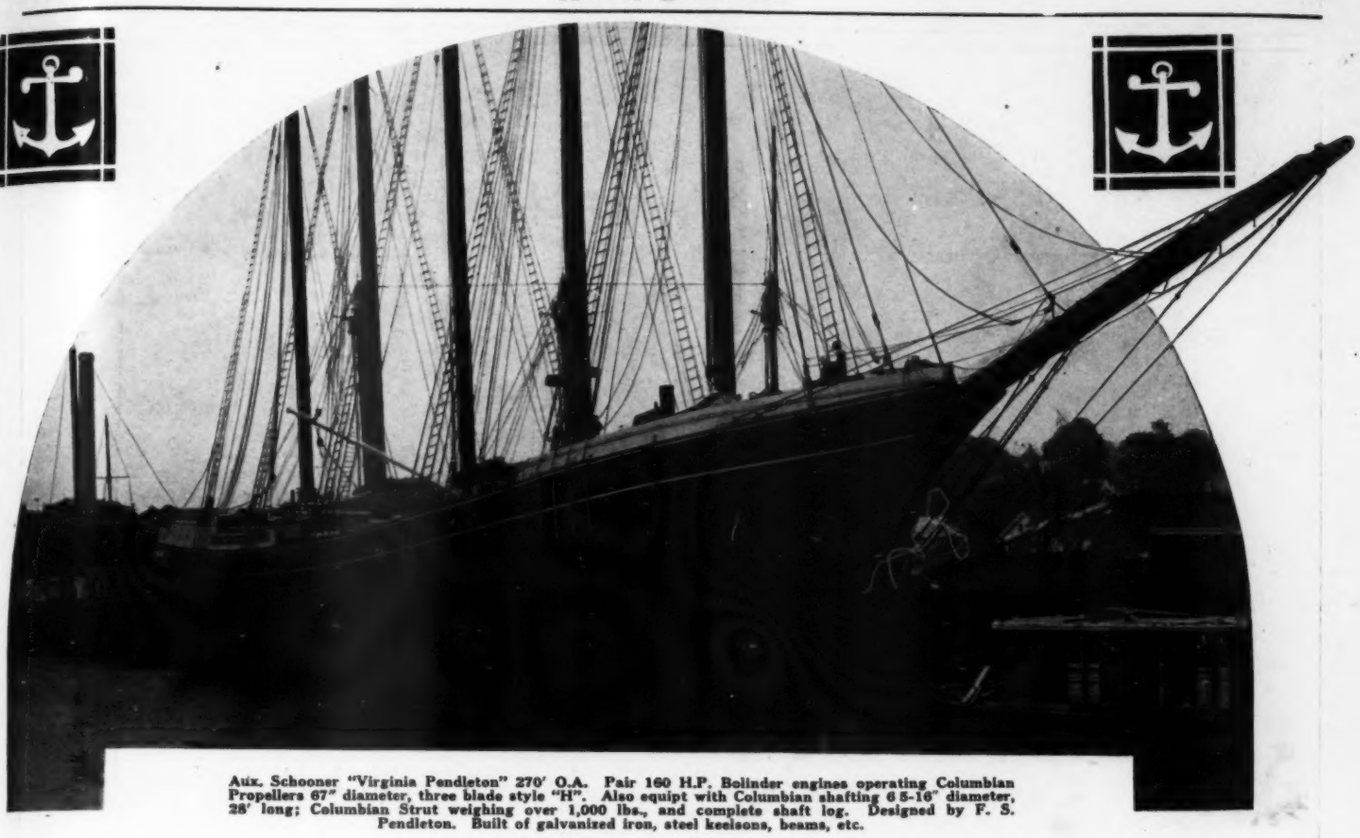
COLUMBIAN BRONZE CORPORATION

GENERAL OFFICES:—50 CHURCH STREET, NEW YORK CITY.

New York City Local Salesroom—Concourse, 50 Church Street **Factory—Freeport, Long Island, N. Y.**

Address all mail to the General Offices except for New York City Sales

"STERLING II" 26' x 5' V-Bottom Runabout, designed by Crouch and built by Leyare Boat Works. Speed 34 M.P.H., with a four cylinder Sterling engine turning an 18 x 28" Columbian Rocket Propeller, 1450 R.P.M. Owned by Wm. Bruns, New York City.



Aux. Schooner "Virginia Pendleton" 270' O.A. Pair 160 H.P. Bolinder engines operating Columbian Propellers 67" diameter, three blade style "H". Also equipt with Columbian shafting 6 5-16" diameter, 28' long; Columbian Strut weighing over 1,000 lbs., and complete shaft log. Designed by F. S. Pendleton. Built of galvanized iron, steel keelsons, beams, etc.

PROPELLERS

The Fastest Boat in the World uses a Columbian Propeller. "Whip-po-Will, Jr.," illustrated hereunder, averaged 69.39 M.P.H. in six one-mile runs on Lake George under official A. P. B. A. supervision and timing. One run was made at 70.15 M.P.H. Further evidence of the ability of our Designers to design propellers of the highest efficiency.

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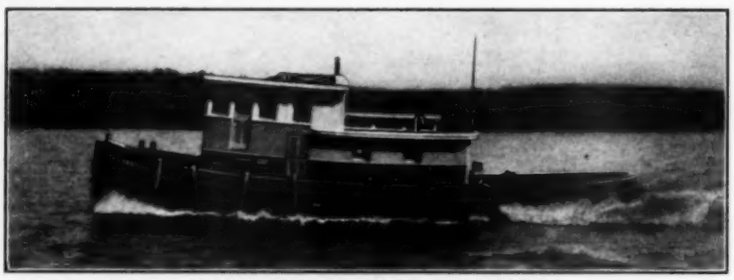
Seventy miles an hour in a hydroplane. "Whip-po-Will, Jr." Commodore Judson's wonderful hydroplane, powered with a twelve cylinder Van Blerck engine, operating a 22 x 38" Columbian Ailsa Craig Propeller, created a new official record of 69.39 M.P.H. at standardized mile trials on Lake George. Best one-mile dash at 70.15 M.P.H.



100 H. P. TOW BOAT GEORGE C. VANTUYL

SAVES
$540.00
A MONTH

ECONOMICAL POWER

Chicago, Ill., Sept. 29, '17.
Mr. H. Jacobsen,
25 No. Dearborn St., Chicago, Ill.

I have a 50-H. P. Galusha Gas Producer in connection with a 60-H. P. Engine installed in my Passenger Boat the "CHICAGO" plying between Lincoln Park, the Municipal Pier and Grant Park.

Here is a brief report or data of the operation during this summer:—

I have run my boat every day, (a few rainy days excepted) from about 9 A. M. to 11 P. M. without losing one minute, and I run the engine "dead slow" at the docks without any danger of stalling. This shows absolute reliability.

The consumption of Pea Coal has amounted to not over 1½ tons of coal a week or a cost per day of less than $2.00 while gasoline would have cost me $20.00 per day, a saving in cost of fuel of some $540.00 per month. This is real Economy.

I have run my boat all day in storms and heavy seas, when all the "double deckers" had to tie up at their docks, and this weather did not interfere with the operation of the gas producer at all.

To prove my satisfaction, I will add, that I shall most certainly install this kind and make of power in my next boat.

Very truly, FRED WEIMER.

In hard service two years. Uses but 1000 lbs. of coal in ten hour run. Coal gas used instead of gasoline in a gasoline engine. Sister steam tug uses four times as much coal to do the same work.

Lower First Cost and Fuel Cost

than is the case with Diesel and other oil engines. ONE-TENTH the fuel cost of gasoline. ONE-FOURTH the fuel consumption of a steam engine. Use coal, charcoal or coke fuel and a gas or gasoline engine.

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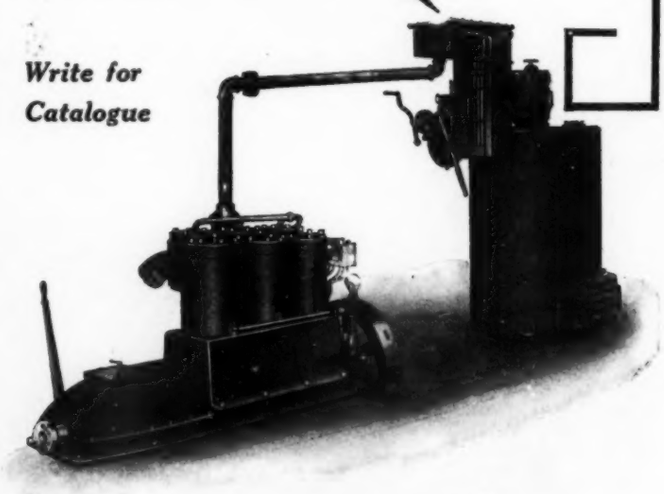

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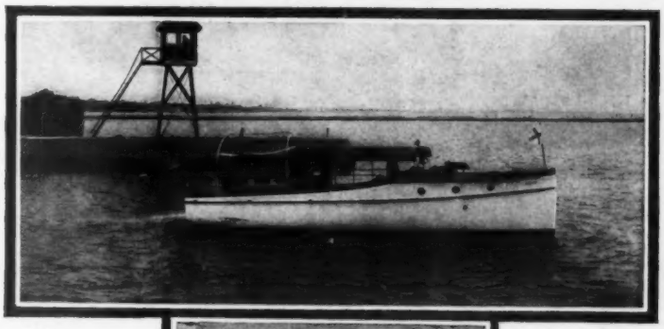
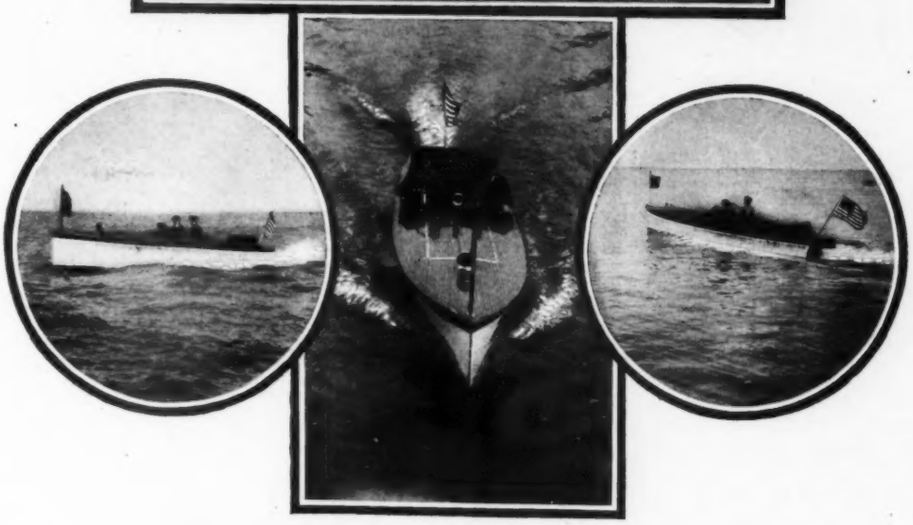




"RACINEWIS" WATER CRAFT

Almost every motor boat enthusiast is familiar with the quality of Racinewis boats, the Racine Boat Company (Racine, Wisconsin) being one of the oldest and best known boat manufacturers in the country.

A splendidly equipped, modern boat building plant; a managing directorate of reputation and high standing in naval architecture and scientific boat construction and a corps of skilled and experienced workmen have developed Racinewis boats to the end that the finished product will permit of no adverse criticism.

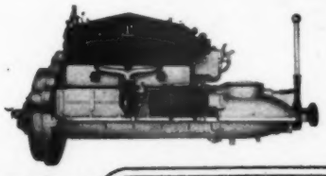
Herewith are shown two numbers in the wide line manufactured by this company. Above a 39½ ft. raised deck cruiser, having a beam of 9 ft. 6 in., draft 2 ft. 6 in. driven 12 miles per hour by a six cylinder, medium duty, all-enclosed 40 H.P. SCRIPPS.

This splendid outfit was shipped to a client in Portuguese East Africa—another evidence of the worldwide use of SCRIPPS motors and the facilities of the Racine Boat Company to execute particular commissions.

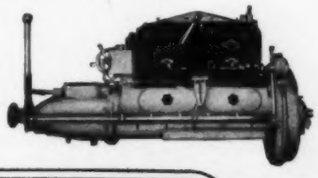
The runabout illustrated in the lower panel is the Racinewis 23 ft. express runabout, which is remarkably complete with every convenience for safety, comfort and speed. Cleanness and quietness of operation are assured by the installation of a Series "B" all-enclosed Model HB SCRIPPS.

The better established and more conservative boat builders like the Racine Boat Company take pains to install and recommend only motors of recognized merit. You will find the SCRIPPS on the honor list of any reliable builder, who will be glad to figure with you on your next boat with SCRIPPS power.

SCRIPPS power plants come in four and six cylinders, in various types and sizes—10 to 125 H.P., with optional equipment permitting the use of gasoline, kerosene or distillate. Among the different SCRIPPS models are motors suitable for pleasure, speed, cruiser or commercial service.



Quality and equipment considered, SCRIPPS prices are surprisingly reasonable. Catalog on request.



SCRIPPS MOTOR CO., 631 Lincoln Ave., Detroit, Mich.

THE JOES REVERSE GEARS

A gear for every boat, be it runabout, Cruiser, hydroplane or work boat. Extensively used by the United States and our Allies.

The Joes Gears are adapted to every use. Note their success in Miss Detroit and Miss Minneapolis, the world's record breaking speed boats, and their extensive use on heavy passenger boats, tugs and auxiliaries. If you want the gear that has established its leadership by real service, you'll select the Joes.

The Joes Duplex Drive is pre-eminent as a heavy duty gear with a very high ratio of speed astern. If you want action when you pull the lever get the Joes.

The Snow & Petrelli Mfg. Co.

Write for Catalog

Manufacturers of

The Joes Reversing Gears, Oneway Clutches
Safety Rear Starters, etc.

154 BREWERY STREET NEW HAVEN, CONN.

AGENTS: J. King & Co., 10 Church Row, Limehouse, E. London, Eng.; L. H. Coolidge Company, Seattle, Wash.; Wood Vallance & Leggatt, Vancouver, B. C.; A. R. Williams Machinery Co., Toronto; W. E. Gochenaur, 631 Arch Street, Philadelphia, Pa.; Pyke Motor & Yacht Co., Montreal, P. Q., Canada; Sutter Brothers, 30 Church St., New York, N. Y. Service Station. Foot of 92d Street, Brooklyn, N. Y.

Albany Fifty-Foot Express Cruiser

The latest development in Express Cruisers, not only in the matter of speed, but also in the matter of accommodations, seaworthiness, appearance and dependability. Into this boat has been condensed all the experience and knowledge gained by our years of experience as builders of really fine boats. It is a standardized boat, built to standardized specifications and manufactured on a definite manufacturing schedule. There is nothing haphazard about either its design, its construction or its equipment. Every detail is right because we have proved it to be right in actual practice.

It is the best boat we know how to build. It is not a cheap boat, neither is it a high priced boat. We have just gone ahead and designed and built the best Fifty Footer we knew how to turn out, then have made up our selling price from our actual manufacturing costs sheets—the only really fair and satisfactory method of arriving at a proper selling price for any product.

A booklet has been prepared on this Fifty-Foot Albany Express Cruiser describing and illustrating this spectacular boat in full detail. Write to-day for booklet No. 60

ALBANY BOAT CORPORATION :: WATERVLIET, N. Y.

DEVOE *Marine Specialties*

COLUMBIA YACHT WHITE

Columbia Yacht White is a semi-gloss, permanent white, producing an egg shell finish. Its long-wearing surface defies salt water and hard usage. Stays white under all conditions; can be scrubbed. Saves mid-season hauling out. Economical and easy to apply because it spreads well, flows evenly and works easily under the brush.

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Vernosite keeps the bright-work bright. It is the original "long-life spar varnish." Neither wear nor weather can make it check, blister or turn white. The guarantee formula on every can is your assurance that only 100% PURE ingredients are used in this DEVOE varnish.

DECK PAINT

For decks and all other under-foot surfaces that must stand severe wear, use DEVOE Deck Paint. It dries hard and gives the best wear-resisting surface to counteract the hard usage that a deck or porch floor receives. Ready for use.

BATTLESHIP GRAY

Made in accordance with U. S. Navy Standard Specifications. A lasting and practical paint for yachts and motor boats.

At paint, hardware and ship supply dealers

Send for it NOW

Here's a booklet that tells how to make your craft good-looking, and how to keep it so. Sent free with sample panel finished in Columbia Yacht White (semi-gloss) or in Vernosite "The Long-Life Spar Varnish."

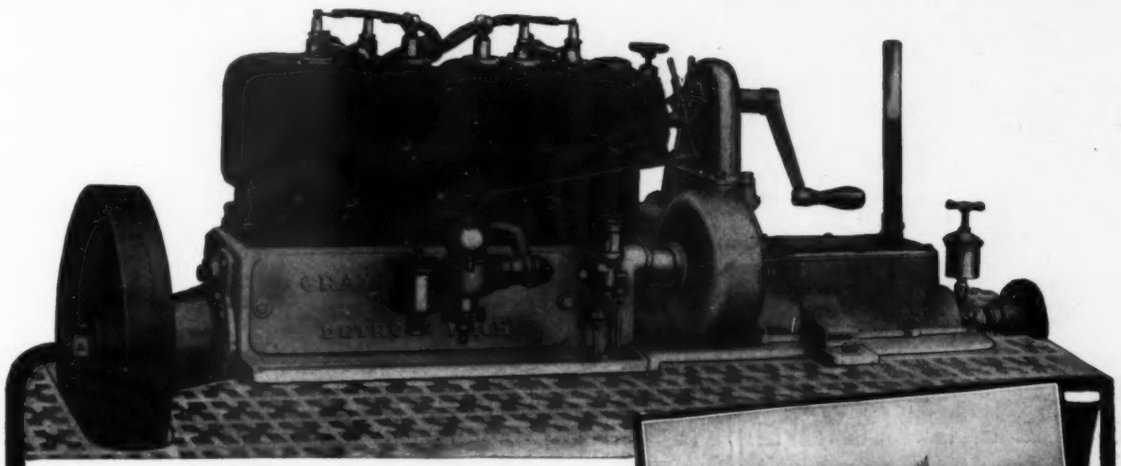
DEVOE

The oldest paint manufacturing concern in the United States. Founded in New York 1754

DEVOE & RAYNOLDS CO., Inc., New York—Chicago

GRAY MOTORS

Largest Builders of Small Marine Motors in the World



Gray Model "D" 4-Cycle

THE ADAPTABLE ENGINE

4 Cylinder, 20-24 H. P.

Made good in every case. Semi Speed-boat, Work-boat, Cruiser and House-Boat.

Designed strictly for *marine* work—a real *marine* motor with all the marine features you have always wanted at a *moderate* price. Manufactured and backed up by an old established and responsible concern.

2 Cylinder 10-12 H. P. Model "D" 4-Cycle

Designed especially for fishing boats or any other boats where reliability, strength and endurance are the chief factors. Can be throttled down to slow speed.

GRAY TWO-CYCLES—Recognized all over the world as the **reliable** two-cycle marine motor. Made in sizes 3 to 8 H.P.

Write today for marine catalog, showing complete line of GRAY two- and four-cycle marine motors. It's

INSTRUCTIVE

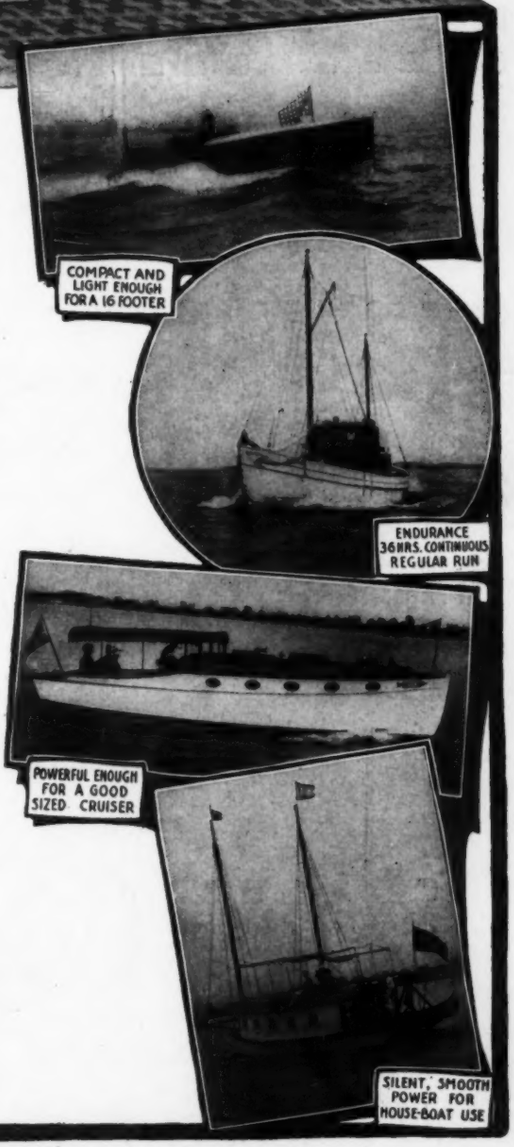
THERE'S A "GRAY" FOR EVERY BOAT
STANDARD THE WORLD OVER
3 to 40 Horse Power $74.00 Upwards

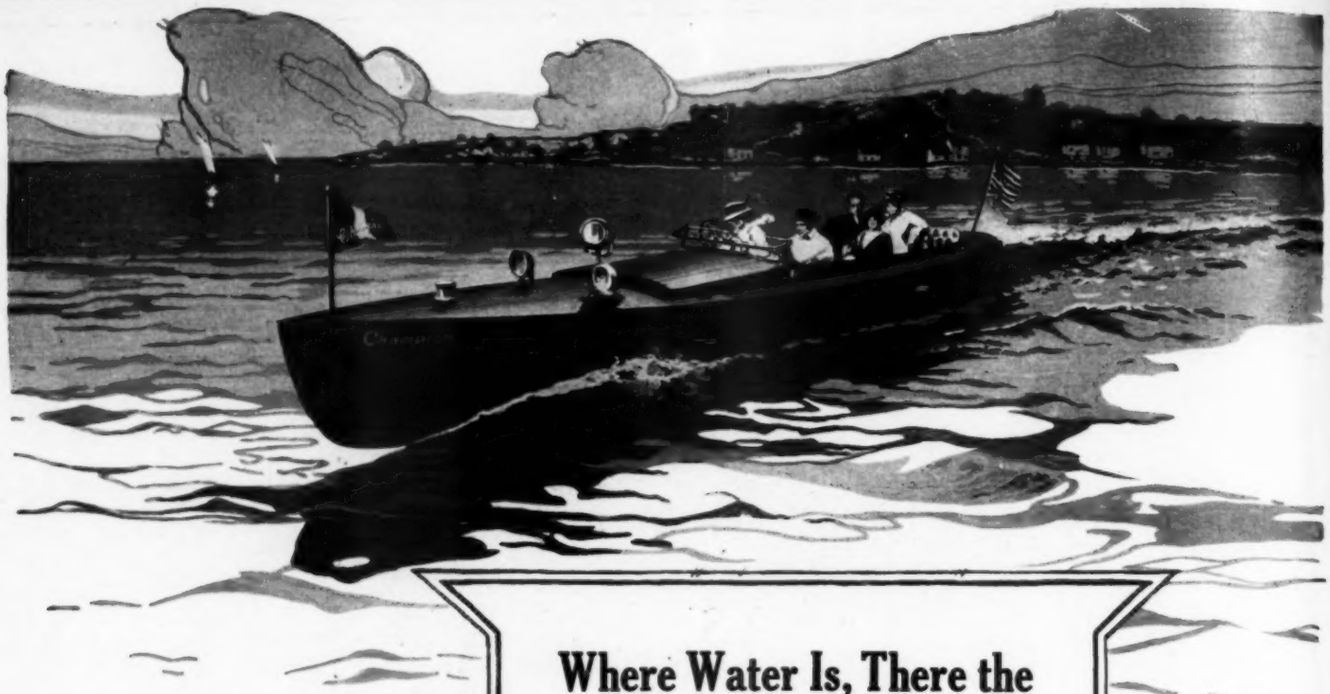
We have been in the Marine Engine business for twenty-one years. We constantly strive for universal efficiency and better motors and as a result Gray Marine Motors are Standard the World over.

SAVE MONEY—ORDER NOW AND AVOID DELAY NEXT SPRING

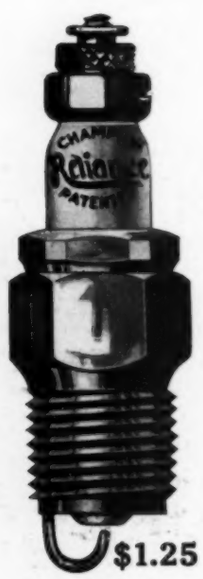
GRAY MOTOR CO.

2106 Mack Avenue DETROIT, MICH.


COMPACT AND LIGHT ENOUGH FOR A 16 FOOTER
ENDURANCE 36 HRS. CONTINUOUS REGULAR RUN
POWERFUL ENOUGH FOR A GOOD SIZED CRUISER
SILENT, SMOOTH POWER FOR HOUSE-BOAT USE



Where Water Is, There the Champion Reliance Is Standard



Moisture is entirely without effect on this standard spark plug for marine motors —the Champion Reliance.

It will actually spark *in water.*

Would you know the dependability that eliminates the waits and delays caused by moisture-shorted spark plugs, equip your marine motor with the Champion Reliance.

See that the name "Champion Reliance" is on the porcelain of the plugs you buy —it is your guarantee of dependability.

All dealers where there is water for motor boating sell the Champion Reliance.

Champion Spark Plug Company
TOLEDO, OHIO

Champion

DEPENDABLE SPARK PLUGS

Ready for the U-Boats

The soldiers, doctors, nurses and others who must cross the ocean and risk their lives in the U-boat Zone are entitled to the utmost protection they can secure. It is *your* privilege and duty to spread the safety idea, to thus preserve American morale and to prevent the enemies' gratification over each American life lost.

A SUPREME TEST in the icy waters of New York Harbor during the record breaking cold weather of January, 1918. Under arctic conditions wearers of the safety-suit plunged into the water, made little voyages on drifting ice-flows, and emerged dry and warm.

Soldiers, officers and diplomats on every liner and transport, including in some cases entire hospital units, are now being protected by the

Ever-Warm Safety Suits

They are ready for the U-boats, ready for whatever may happen, safe in the knowledge that death by drowning or exposure is impossible for the wearer of this suit. It is a Human Thermos Bottle!

The Ever-Warm Safety-Suit is the greatest life saving invention of the age. It has attracted attention everywhere and in a few short months has become known from one end of this country to the other, its story carried broadcast by newspaper, magazine and movie film. In the meantime it has been saving lives and reducing the toll of war wherever it is used. Its absolute success is proven.

One of many complete U. S. Base Hospital Units equipped with this REAL life preserver for the voyage through the U-boat zones to the field of service on the other side.

The Ever-Warm Safety-Suit gets its buoyancy *not from air,* but from a special composition which has five times the buoyancy of cork. It enables the wearer to support at least five other persons afloat indefinitely. Its buoyancy is indestructible—even if the suit be punctured, torn or cut, you cannot drown. And the wearer cannot chill even if submerged in icy water for hours or days. The suit is *put on in less than a minute.*

Investigate the Ever-Warm Safety-Suit. Come to our office if possible, or write us for full information. Tell your friends about it and help to save their lives, and their friends' lives. Don't delay. With our price list and Order Guide you can order by mail or wire.

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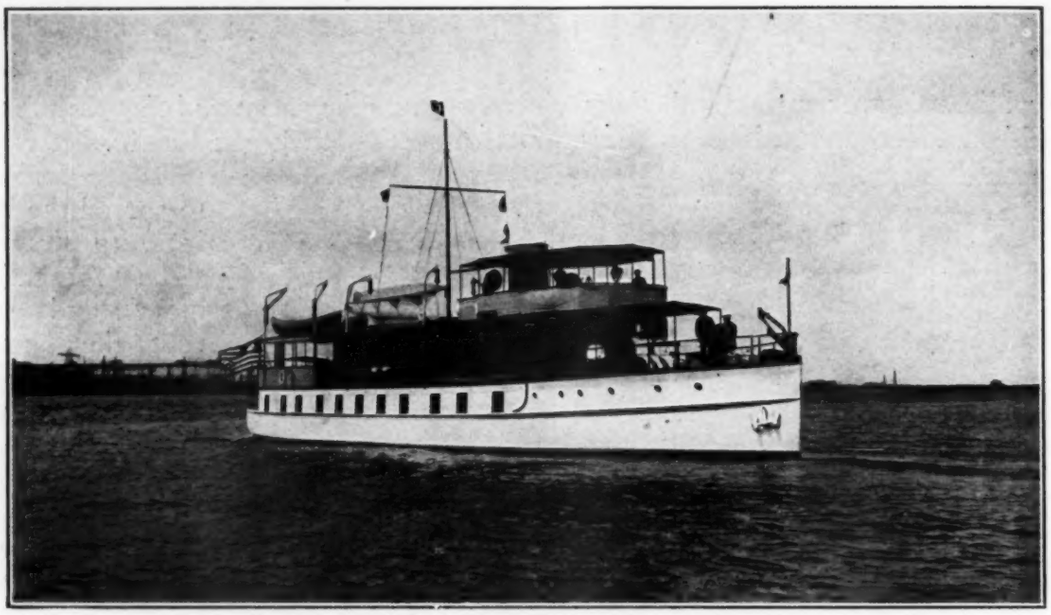

106-ft. Houseboat Leonie, designed and built by us for Mr. Murray Guggenheim, New York

THIS winter, while we are bending our utmost efforts to assist your Uncle Sam in "making the world safe for democracy," it will be no small satisfaction to us to realize that in Florida

Mathis-Built Houseboats

will be making enjoyable the leisure moments of many of America's busiest men.

Added to the large and growing family of Mathis-built houseboats which have been the feature of every Florida season since 1909—when we created the new-type Cocopomelo—will be the boats of men who know where and how to get the utmost in service and comfort. Men like

MURRAY GUGGENHEIM, NEW YORK, whose 106-ft. Mathis-built houseboat Leonie is shown above.

L. H. & A. W. ARMOUR, CHICAGO, whose 106-ft. Chieftain is in many respects similar to the Leonie.

JAS. DEERING, CHICAGO, whose 80-ft. houseboat Nepenthe, we designed and built.

A. P. ORDWAY, NEW YORK, whose 71-ft. houseboat Jane VI, we completed last winter.

H. N. BARUCH, NEW YORK, for whom we have built several houseboats.

The same service which we have given these men is yours, when you are ready to plan or build your houseboat, or cruiser.

MATHIS YACHT BUILDING CO.

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DU PONT AMERICAN INDUSTRIES

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Our nation-wide advertising campaign is producing thousands of inquiries, which must be referred to local dealers near the inquirer.

We need at once in many cities of 10,000 or more population:

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To insure quick action, please give us the following information:

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State nature of your business and line which interests you.

If we refer to you all inquirers from your vicinity, will you do your best to sell them our product?

If you are not a "live wire" and prepared to handle business with push and enterprise, please do not answer this advertisement.

SALES PROMOTION DIVISION
Du Pont, Wilmington, Delaware

DU PONT

When Your Engine is Overhauled

IT will pay you many times over to put in the best piston rings you can buy. Remember—in piston rings you are buying power, the control of fuel and oil consumption and assurance of dependable motor service all through the season ahead.

The one thing that measures piston ring efficiency is equality of tension. The ring must press evenly outward upon the cylinder wall at every point of its circumference—firm enough to prevent gas or power loss, yet light enough not to cause undue friction loss or cylinder wear. This is fundamental to maximum power production and is accomplished by the exclusive design of McQuay-Norris LEAK-PROOF Piston Rings.

The only piston ring composed of two sections of the same size and strength exerting equal radial pressure. These, when fitted together, expand against each other, thus equalizing the radial tension of the whole ring, and thus makes the bearing pressure even all around.

McQuay-Norris LEAK-PROOF Piston Rings have seven years of successful performance records behind them. Seven years of trial and test. Seven years of steadily growing prestige with engineers and engine users founded upon what they've actually done in increasing motor efficiency and economy.

They are made in every size and oversize—fit every make and model of motor or engine. Can be obtained anywhere—any time—through your dealer, garage or repair man. Ask for—and be sure you get—the Genuine McQuay-Norris LEAK-PROOF Piston Rings.

Send for Free Booklet

"To Have and to Hold Power"—a truthful, clear explanation of piston rings—their construction, development and operation. Write Dept. B.

Manufactured by

McQuay-Norris Manufacturing Company,

St. Louis, U. S. A.

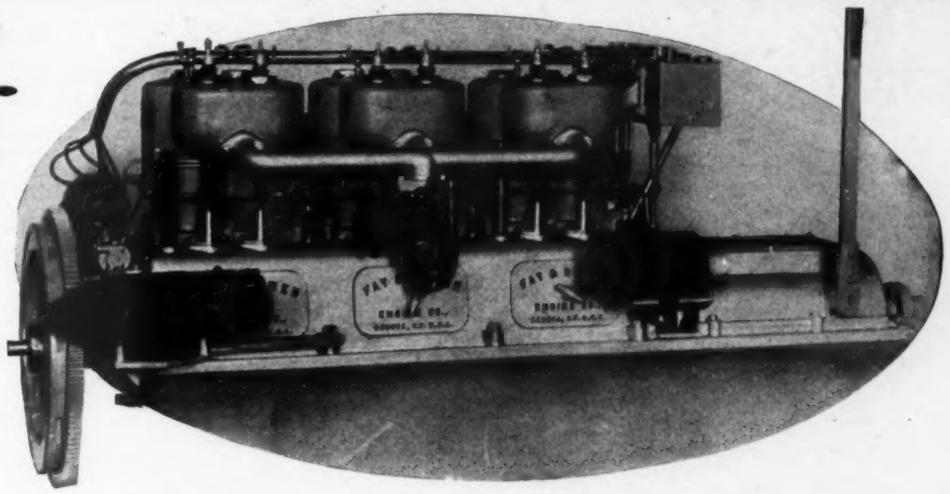
Branch Offices:

New York, Chicago, Philadelphia, Pittsburgh, San Francisco, Los Angeles, Seattle, Kansas City, St. Paul, Atlanta, Dallas

Canadian Factory: W. H. Banfield & Sons, Ltd., 372 Pape Ave., Toronto

Is Your Engine an Oil Gusher?

Many modern motors have excess oil trouble—they are oil pumpers. There is a flow of oil in the cylinders far in excess of what piston rings were planned to control. These motors need one McQuay-Norris Supercyl Ring in the top groove of each piston with McQuay-Norris LEAK-PROOF Piston Ring equipment in the lower grooves to insure maximum compression, power and fuel economy. The McQuay-Norris Supercyl is a specially constructed ring with an Oil Reservoir which collects all of the excess oil from the cylinder wall on the down stroke of the piston, leaving just the film necessary for proper lubrication. It will keep cylinders and spark plugs clean, do away with smoky exhausts and reduce oil consumption.



Fay & Bowen Engines—A Source of Constant Satisfaction, Always

BUILT to give reliable service **always** and **all ways,** the FAY & BOWEN ENGINES meet every reasonable demand without delay or complaint, and may be depended upon to render this kind of service year after year. We are prepared to convince you thoroughly before we ask you to purchase. Write for descriptive literature and mention your requirements.

FAY & BOWEN ENGINE COMPANY

104 LAKE STREET, GENEVA, N. Y., U. S. A.

Four-cycle Engines,
Two-cycle Engines,
Finished Motor Boats,
Electric Lighting Units,
And Pumping Sets.

NEW YORK: 50 Church St., on Concourse, Sutter Bros., Representatives.
Built for Canada by ST. LAWRENCE ENGINE CO., LTD., BROCKVILLE, ONT.

"PEGGY" A 45′ x 10′ CRUISER

A six-cylinder 5″ x 6¼″ Fay & Bowen engine drives "Peggy" 14 miles an hour.

A LETTER FROM THE OWNER

"In the Spring of 1916 I installed in my cruiser **Peggy** a new six-cylinder Fay & Bowen engine and am pleased to advise you of the very satisfactory results I am obtaining. It has met all the requirements as to revolutions, speed and gas consumption, and it is, indeed, a pleasure when cruising to know one has an engine that is in every way dependable and safe."

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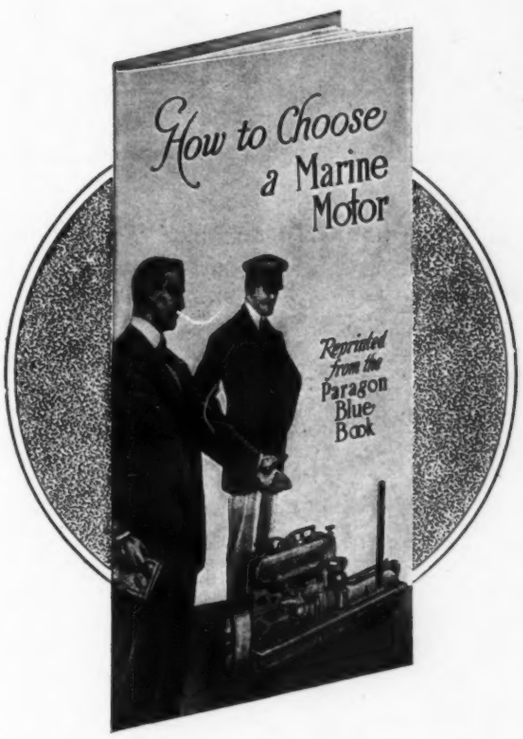

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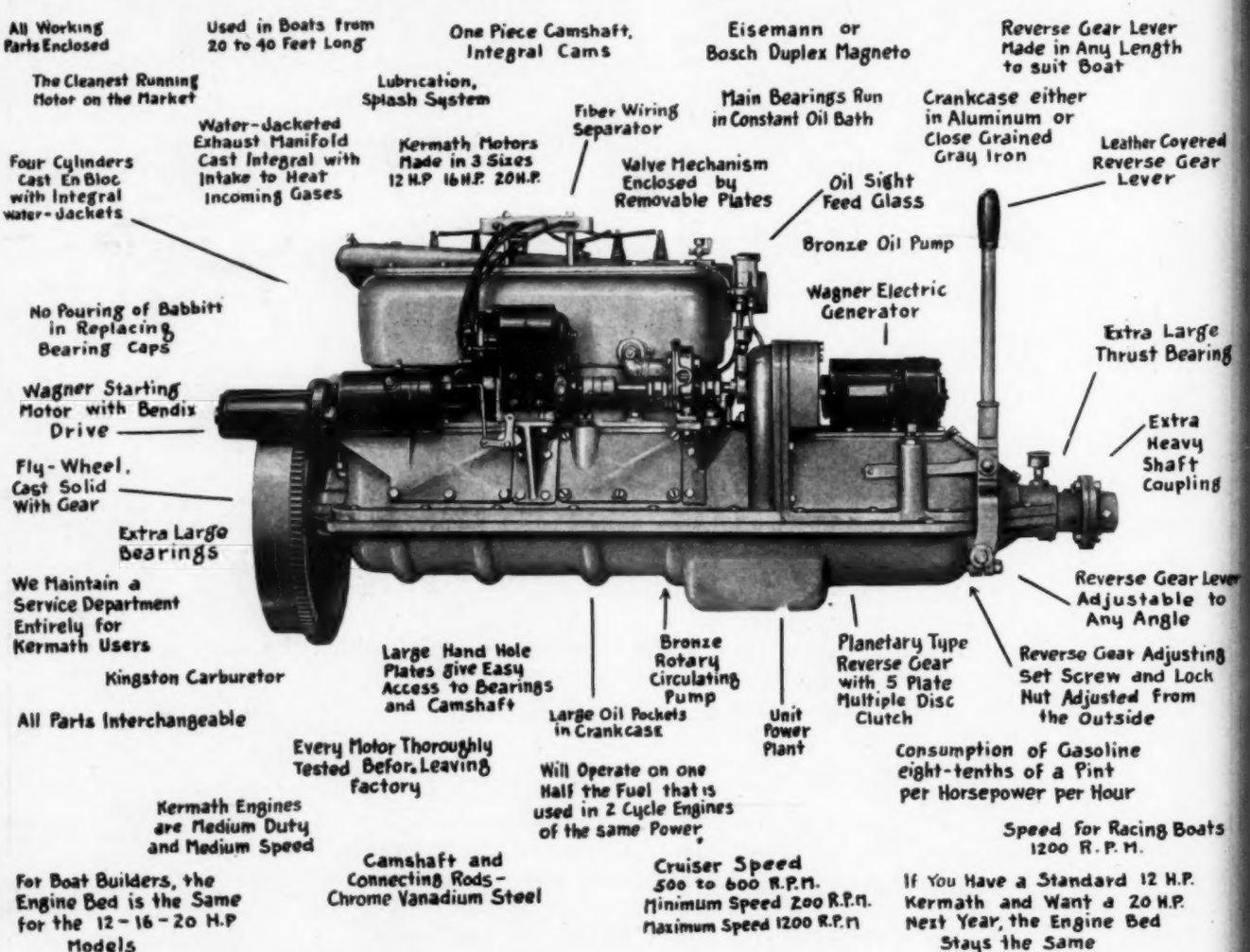
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